This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Stanford University Libraries
3 6105 013 934 059

595.705
E6147

THE

ENTOMOLOGIST

An Illustrated Journal

OF

GENERAL ENTOMOLOGY.

EDITED BY RICHARD SOUTH, F.E.S.

WITH THE ASSISTANCE OF

ROBERT ADKIN, F.E.S.
T. R. BILLUPS, F.E.S.
W. LUCAS DISTANT, F.E.S., &c.
EDWARD A. FITCH, F.L.S., F.E.S.
F. W. FROHAWK, F.E.S.
MARTIN JACOBY, F.E.S.
W. F. KIRBY, F.L.S., F.E.S.
J. H. LEECH, B.A., F.L.S., F.E.S.
Dr. D. SHARP, F.R.S., F.E.S., &c.
G. H. VERRALL, F.E.S.
W. WARREN, M.A., F.E.S.

"By mutual confidence and mutual aid
Great deeds are done and great discoveries made."

VOLUME THE THIRTIETH.

LIBRARY
LELAND STANFORD JUNIOR
UNIVERSITY

LONDON:
WEST, NEWMAN & CO., 54, HATTON GARDEN,
SIMPKIN, MARSHALL, HAMILTON, KENT & CO., Limited.

1897.

131757

CONTENTS.

ALPHABETICAL LIST OF CONTRIBUTORS.

Adkin, B. A., 269, 270
Adkin, Robert, F.E.S., 25, 205, 232, 266
Alderson, M., 270
Anderson, Joseph, Jun., 271, 298
Andrew, Wilfred J., 271
Arkle, J., 45, 70, 142, 252, 296, 297
Ashby, Herbert, 81
Auld, Henry A., 301, 321

Bankes, Eustace R., M.A., F.E.S., 48
Barrett, Charles C., F.E.S., 18, 144, 199
Bartlett, Chas., 298
Bedford, C. E., 123, 198
Bedford, F. P., 49
Beeching, Rev. R. A. Dallas, 221
Bell-Marley, H. W., 48, 122, 198, 247, 248, 270
Bird, J. F., 144
Bland, Francis D., 20, 176
Bonaparte-Wise, L. H., 200
Bonus, Rev. Albert, 248
Briggs, F. G., 113
Buckley, W., 298
Burkill, Harold J., 140
Burr, Malcolm, F.E.S., 28, 187
Butler, Arthur G., Ph.D., F.L.S., F.E.S., &c., 170
Butler, W. E., 145, 270, 297

Christy, W. M., M.A., F.E.S., 76, 222, 298
Claxton, Rev. W., 15
Cockerell, T. D. A., F.Z.S., F.E.S., 12, 135, 305
Conquest, G. Harold, 102

Dale, C. W., F.E.S., 18
Dannatt, W., F.E.S., 175, 312
Doncaster, L., 152, 179

Edelsten, H. M., 45
Edwards, W., 298
Elwes, Henry John, J.P., F.R.S., F.L.S., F.E.S., &c., 26

Fitch, Edward A., F.L.S., F.E.S., 122
Fountaine, Margaret E., 4, 297
Fowler, J. Hy., 18, 112
Freeman, Rev. R., 322

Goss, Herbert, F.L.S., F.E.S., &c., 348
Graves, Spotswood, 144
Gummer, Cecil M., 270

Hall, E. V., 272
Harcourt-Bath, W., 16, 55, 77, 97, 123, 157, 206, 240
Harrison, J., F.E.S., 298
Hart, George E., 17
Harvey-Jellie, Rev. B., B.A., 269, 322
Harwood, Bernard S., 82
Harwood, W. H., 143
Hewett, William, 19, 119
Hill, H. Ainslie, F.E.S., 174
Hughes, C. N., 298
Hunt, W., 82
Hyde, J. T., 321

Immage, Selwyn, F.E.S., 18, 221
Imms, Augustus D., 123, 219, 249, 272, 273, 295, 299, 320, 322

Jacoby, Martin, F.E.S., 120, 168, 193, 216, 220, 261
Jefferys, T. B., 200, 323

Kane, W. F. de Vismes, M.A., M.R.I.A., F.E.S., 17, 36, 58, 81, 100, 104, 128, 212, 233, 286, 310
Kirkaldy, G. W., F.E.S., 238, 258
Knaggs, H. Guard, M.D., F.L.S., 75, 144, 256, 265, 313, 318

Lambert, F. W., 248
Leake, B. M., 78, 176
Lewington, W., 298

Livett, H. W., M.D., F.E.S., 75
Lucas, W. J., B.A., 18, 29, 76, 125, 142, 269, 277, 321

Machonochie, Rev. J. A., B.A., F.E.S., 269
Marsden, H. W., 220
Mathew, Gervase F., R.N., F.L.S., F.E.S., &c., 45
Mathew, Gwendaline, 248
Menshootkin, B. N., 80
Mera, A. W., 200
Meynell, E., 297, 299
Mitchell, Alfred T., 318, 322
Morris, J. B., 267, 271
Moss, Rev. A. Miles, 290

Nash, C. J., 15, 116
Nevinson, E. B., 222
Newbery, F. A., 24, 154, 329
Newenham, Rev. A., 177

Pierce, F. N., F.E.S., 93, 153
Platten, E., 322
Prout, Louis B., F.E.S., 140, 296
Pyett, Claude A., 73, 123

Ransom, Edward, 78, 269, 270
Raynor, Rev. Gilbert H., 269
Raynor, L. G. S., 269
Regnart, H. C., 18
Renshaw, Graham, 272
Rickard, J. C., 1, 270
Rollason, W. A., 320
Rothschild, the Honble. Walter, F.Z.S., F.E.S., &c., 165
Rowland-Brown, H., M.A., F.E.S., 198
Rowntree, James H., 269

Sabine, E., 77
Shepheard-Walwin, H. W., 321
Shipp, John W., 16, 62, 131, 166
Sich, Alfred, F.E.S., 176, 271
Sladen, C. A., 81
Smith, G. W., 11, 127, 220
Smith, John B., Sc.D., 50, 189
Smith, W. W., F.E.S., 317
South, Richard, 74, 126, 140, 143, 173, 174, 175, 176, 181, 196, 197, 200, 220, 221, 222, 231, 242, 244, 247, 264, 265, 266, 269, 270, 271, 294, 295, 296, 297, 298, 316, 317
Stares, Madaline J., 297
Studd, E. F., M.A., F.E.S., 146

Tait, Robert, Jun., 120, 123
Tarbat, Rev. J. E., 221, 222
Tetley, Alfred S., 82
Theobald, F. V., M.A., F.E.S., 162
Thornewill, Rev. Chas. F., 200
Thwaytes, J. E., 250, 299
Tremayne, Lawrence J., 96, 227
Turner, Hy. J., F.E.S., 23, 87, 151, 178, 203, 224, 275, 327
Tutt, J. W., F.E.S., 184, 254, 284

Verrall, G. H., F.E.S., 221

Wailly, Alfred, 39
Wainwright, Colbran J., F.E.S., 96, 152, 252, 276, 328
Walker, Rev. F. A., D.D., F.L.S., F.E.S., 122, 223, 267
Wall, Geo., 75
Warburg, J. C, 47
Waters, Albert H., 48, 74
Waugh, H. W., 180
Wells, H. O., 233
Whittle, F. G., 114, 273, 321
Wilde, E. H., 222
Wilson, M., 247
Woodforde, F. C., 222

ALPHABETICAL LIST OF SUBJECTS.

Aberrations of Epinephele hyperanthus (figs.), 49; of E. tithonus, 254, 292; of Lepidoptera, 79
Abnormal Halticid beetle, 300
Abraxas grossulariata, vars. (figs.), 25; vars. conspurcata and sinicaria, 314; var. varleyata, 85; bred in December, 176; sylvata, 116, 216, 314, 325
Abrostola, 170
Acanthosoma hœmorrhoidale, variation in the colour of, 78; tristriata, 326
Acherontia atropos in 1896, 18, 69, 75, 84, 85, 109, 113, 122, 176, 219, 223, 269, 298, 322, 323
Acidalia bisetata, 130; dimidiata, 130, 326; emarginata, 73, 74, 111, 116; fumata, 213; imitaria, 111, 116, 145, 213; immorata, 275; immutata, 131; inornata, 213, 270, 325; marginepunctata, 22, 115, 130, 249; ornata, 74, 130; osseata, 74; promutata, 73; remutaria var. lactata, 212; rusticata, 130; straminata, 109; subsericeata, 111; trigeminata, 225; virgularia, 130
Aciptilia galactodactyla, 74; tetradactyla, 74
Acontia luctuosa, 116, 273
Acosmetia morresii, 256, 284, 296, 303
Acridium ægyptium, 188
Acronycta aceris, 74, 110, 115, 321; alni 20, 108, 145, 176, 298, 321; leporina, 275; ligustri, 110; myricæ, 275; psi, 300; tridens, 48
Actias luna, 43
Æschna borealis, 34; cyanea, 34, 273, 274, 282; grandis, 34, 70, 251, 271, 273, 275,; juncea, 34, 70, 251; mixta, 282; rufescens, 34
Agarista glycinæ, 154
Aglais (Vanessa) urticæ, 324,—var. ichnusa, 149, 327
Aglossa cuprealis, 114
Agrion cyathigerum, 35, 278, 283; mercuriale, 35, 275; puella, 35, 70, 251, 271, 273, 282; pulchellum, 35, 279
Agrophila sulphuralis, 275
Agrotis ashworthii, 68, 95, 250; from ova, 120; auxilaris, 84; cinerea, 81, 115, 145; corticea, 249, 273; recorded in error, 145; exclamationis, 327; lucernea, 69; puta, 145; obelisca, 110; ravida, 249; saucia, 110, 113; subgothica, 84; tritici, 114
Alaptus fusculus, parasitic on eggs of Stenopsocus cruciatus, 177; minimus, probably male of fusculus, 177
Alderney, Entomology of, 223
Aleucis pictaria, 111
Ammophila sabulosa, 275
Amphidasys betularia var. doubledayaria, 60, 69, 72, 222, 318; striataria, 60, 69, 116, 178, 226, 250; prodromaria, 107, 327
Anaitis plagiata, 22, 314
Anarta myrtilli, 69, 252
Anax formosus, 14, 224, 278, 279, 281; imperator, 180
Anchocelis litura, 113, 299; lunosa, 299; rufina, 113, 299
Andrena from N. America, new species of, 305
Andrena aliciarum, n. sp., 138
Androconia of Pieris oleracea and P. rapæ, 2
Anesychia decemguttella, 146
Angerona corylaria, 80; prunaria, 74, 245, 318
Anisolabis annulipes (fig.), 125, 323
Anosia chrysippus, 94; menippe, 18; plexippus, 94
Antipalocoris marshalli, 324
Ants in Smyrna, a curious use of, 318
Aporia cratægi, 9
Antennæ of Hybernia aurantiaria and H. defoliaria, 85
Anthocharis cardamines, 22, 108; charlonia, 94
Anticlea berberata, 111; rubidata, 146
Antithesia salicella, 273
Anthophora furcata, 275
Apamea ophiogramma, 178, 180, 326
Apanteles caiæ, 122; difficilis, 122; formosus, 252
Apatura ilia var. elytie, 210; iris, 94, 102, 210
Aphodius lividus, 180
Aphomia sociella, 93
Aphytoceros vagans, 126
Apion astragali, 151
Aplecta advena, 273; oculta, 85, 87, 329
Apocheima pedaria, 247
Apodia bifractella, 273
Aporia cratægi, 209, 230, 300, 327; hippia, 276
Apterygida arachidis, 177
Arctia caia, 23, 94, 95, 96, 326; fuliginosa, 110, 275; mendica, 110; villica, 23
Argynnis adippe, 109, 119, 211, 249; aglaia, 211, 249, 329; dia, 211; euphrosyne, 19, 95, 210, 323; hecate, 324; selene, 19, 79; latonia, 10, 211, 242; niobe, 8, 10, 211; pales, 211; pandora, 8, 10; paphia, 108, 109, 123, 211, 248, 300, (Dryac) 326

Argyresthia conjunctella, 71, 72; nitidella, 72
Ascalaphus cocejanus, 202; maccaronius, 202
Asemum striatum, 224
Asilus crabroniformis, 325, 328
Asphalia diluta, 95; flavicornis, 112, 250; ridens, 225, 327
Aspidiotus coloratus, 14; ficus, 14; uvæ, 14
Aspilates citraria, 108; gilvaria, 73, 215; ochrearia, 215
Asteroscopus sphinx, 115, 116, 145
Asthena candidata, 130; luteata, 72, 130
Atractotomus mali, 274
Attacus atlas, 43; aurota, 43; carpini, 39; hesperus, 44; cynthia, 44; pyri, 39; spini, 39
Aventia flexula, 111, 145

Bapta bimaculata, 213, 245; temerata, 213
Batodes angustiorana, 73
Beetle-wings in casts of rook, 177
Belostoma niloticum, 188
Berkshire—Agrotis cinerea, 145; notes from Reading, 114, 145
Boarmia abietaria, 113, 314; cinctaria, 105, 108, 178, 313; consortaria, 110, 115, 313; gemmaria var. perfumaria, 104; repandata, 22, 61, 85, 313,—var. conversaria, 145; rhomboidaria, 249, 251; roboraria, 108, 110, 202, 313
Bombus latreillellus, 95
Bombyx neustria, 200, 323; otus, 39; quercus, 20, 68, 225; rubi, 20, 69, 71, 122, 226, 249, 250, 265, 291, 279, 299; trifolii, 87
Bomolocha fontis, 36
Botys hyalinalis, 111, 242
Brachycerus apterus, 148
Brachysomus hirtus, 323
Brachytron pratense, 34, 282
Brenthis (Argynnis) euphrosyne, 22, 23
Brephos parthenias, 37, 71, 117, 154, 250
Bryophila glandifera, 110; muralis, 274; perla, 86
Buculatrix boyerella, 71; ulmella, 71
Bupalus piniaria, var. flavescens, 215
Butalis fallacella, 22
Butterflies, changes in the structure of the wings of, 203; of British, 325; and flowers, 144; on the Riviera, 202; of Sicily, 4
Butterfly destruction by birds, 202; hunting in the Himalayas, 240

Cabera exanthemata, 246; rotundaria, 213
Callicera ænea, 84
Calligenia miniata, 110
Callimorpha dominula, 108, 116, 294 (yellow), 22, 294; hera, further notes on, 18, 22, 123, 178, 248, 274, 294
Callosamia angulifera, 43; promethea, 43
Calocampa exoleta, 95, 299
Calopteryx splendens, 34, 273, 279, 282; virgo, 34, 273, 279, 282
Calymnia diffinis, 145
Cambridgeshire—Chœrocampa celerio, 270, 328
Camptogramma bilineata, 22, 85
Capua ochraceana, 72
Carabus lusitanicus, 83
Caradrina ambigua, 325, 327; morrisii, 256
Carpocapsa pomonella, 73; saltitans, 87, 328
Carterocephalus palæmon, 103
Cataclysta lemnata, 242
Catocala adultera, 79; fraxini, 79; nupta, 48, 73, 79, 115, 266, 320, 321; pacta, 79; paranympha, 79; promissa, 79, 109
Catoptria juliana, 72
Cepphis advenaria, 246
Ceratophora inornatella, 273
Cerceris acanthophilus, n. sp., 135
Cerura vinula, 319
Chalcolepidius, a species of, 93
Chalcophana, new species of, 169, 193, 216
Chalcoplacis gigas, n. sp., 168
Charæas graminis, 67, 110
Charagria ramsayi, 324; splendens, 324
Charaxes jasius, 7, 10, 178, 202
Chariclea umbra, 95
Cheimatobia brumata, 45, 74
Chelisoches morio, 201
Cheshire—Sesia culiciformis, 200; notes from the Chester district, 67, 250
Chesias rufata, 146
Chilo phragmitellus, 114
Chilosia berganetammi, 152
Chironomid larvæ, 329
Chœrocampa celerio, 328; elpenor, 116, 247, 291; porcellus, 95, 116, 219, 270, 292, 322
Chortodes bondii, 284, 303; morrisii, 284
Christoph collection, the, 74
Chrysiridia madagascarensis, 178
Chrysogaster virescens, 152
Chrysophanus dorilis, 209; gordius, 210; hippothoë, 209; phlœas, 22, 23; virgaureæ, 209
Cicada larva with fungus, 84
Cicadetta montana, 148
Cicindela germanica, 248
Cidaria associata, 111; dotata (pyraliata), 67, 111; corylata, 71,—var. albocrenata, 22, 328; immanata, 109; miata, 111, 115; prunata, 146; psittacata, 111; pyraliata, 116; reticulata, 153; russata, 67; silaceata, 23; suffumata var. piceata, 202; truncata, 326
Cilix glaucata, 115; spinula, 73, 108
Cimbex sylvarum, 152

Cionus scrophalariæ, 224
Cirrhœdia xerampelina, 94, 96, 114
Classification of insects, an essay on the, 189
Cledeobia angustalis, 111
Cleonus nebulosus, 93
Cleora glabraria, 110, 113, 313; lichenaria, 61, 110, 150, 224
Climatal conditions in deciding morphological characters, subordinate influence of, 97
Clisiocampa castrensis, 233
Cloantha solidaginis, 149
Clythridæ and Eumolpidæ, new species of, 261
Cnethocampa pityocampa, 149
Coccid, new British, 300
Coccidæ, descriptive notes on two, 12; from Algeria, 21; of Ceylon, 20
Coccinella hieroglyphica, 22
Cockroaches, immigrant, 142
Cocoons, South American, 328
Cœnonympha arcania, 212; iphioides, 324; iphis, 23; pamphilus var. lyllus, 8, 11; satyrion, 23; typhon, 23, 251
Coleophora albitarsella, 114; anatipennella, 71, 273
Coleoptera, in 1897, 299; in January, 82; from Cintra, 83; from the Tyrol, 83; in the New Forest, 227
Colias chrysotheme, 296; edusa, 8, 10, 109, 209, 223, 248, 269, 298, 299, 321, 322,—var. helice, 8, 10,—var. minor, 10; erate, 153; hyale, 153, 178, 209; phicomone, 209; romanovi, 153
Collection of insects and the elucidation of scientific problems, 78
Colotois pennaria, 246
Comma butterfly of America, the, 172
Conchylis straminea, 72
Conops vescularis, 226
Cooked locusts, 84
Cordulegaster annulatus, 70, 271, 273, 280
Cordulia ænea, 33, 278, 280, 281; arctica, 33; curtisii, 33; metallica, 33
Cordyceps entomorrhiza, 162
Coremia designata (propugnata), 67; unidentaria, 180; quadrifasciaria, 72
Corixa albifrons, 240; ovivora, 238
Cornwall — Colias edusa, 269, 320; Dianthœcia barretti, 220
Corycia bimaculata, 111; punctata, 74; temerata, 111
Cosmia affinis, 73, 110
Cossus ligniperda, 48, 319
Crabro interruptus, 95
Crambus chrysonuchellus, 72; falsellus, 74; furcatellus, 153; inquinatellus, 73; latistrius, 74; perlellus var. rostellus, 317
Crymodes exulis, 178, 179
Cucullia chamomillæ, 96, 178; umbratica, 20, 48, 116; verbasci, 110, 116
Cyaniris (Lycæna) argiolus, 224
Cymatophora flavicornis, 71; ridens, 108, 111
Cynomyia alpina, 328; mortuorum, 327

Danais erippus, 18
Dasycampa rubiginea, 110, 329
Dasydia obfuscaria, 128
Decadence of British Rhopalocera, the probable cause of the, 55, 102, 139
Decticus albifrons, 188
Deilephila euphorbiæ, 180; galii, 270, 328,—reappearance on the Lancashire and Cheshire coast, 290
Deinostoma dilatatum, 324
Demas coryli, 110
Depressaria alstrœmeriana, 71; arenella, 71; costosa, 73; heracliana, 72; yeatiana, 114
Destroying insects by steam power, 265
Devonshire — Callimorpha hera, 248; captures at Dawlish, 123; Colias edusa, 298; collecting at Sidmouth, 222; Deilephila galii, 270; notes from South, 112
Diamond Jubilee, the, 122
Dianthœcia capsincola, 327; capsophila, 85; conspersa, 86; luteago var. barretti, 220, 222, 224; nana, 274, 325
Diastictis brunneata, 246
Dicranura furcula, 299
Dicrorampha petiverella, 72; plumbana, 72; saturnana, 71; sequana, 114
Dictyonota fuliginosa, 275
Dilinia exanthemata, 246
Diloba cæruleocephala feeding on cherry laurel, 198
Distribution of Rhopalocera, geographical and vertical, 206
Ditula hartmanniana, 273
Dragonflies, 29, 70, 120, 272, 277, (late) 320
Drepana binaria, 145; cultraria, 115, 116, 145; falcataria, 145, 251; falcula, 71; hamula, 48

Earis chlorana, 110, (Halias) 322
Early appearances, 123, 144
Earwig new to Britain, an, 177
Ectobia livida, 28
Eggs of British Lepidoptera for figuring, 221
Elachista rufocinerea, 71
Elateridæ, 146, 148
Electric lamp for sugaring, 180
Electric light, moths taken at, 48
Ellopia fasciaria, 110
Ematurga atomaria, 22
Emblethis verbasci, 300
Emmelesia adæquata, 237; affinitata, 111, 222, 235; alchemillata, 108, 145, 236; decolorata, 67; ericetata, 95;

minorata, 149, 237; tæniata, 236; unifasciata, 74, 236
Empusa pennicornis, 188
Emydia cribrum, 107, 108
Enallagma cyathigerum, 70, 251
Endopisa nigricana, 200
Endotricha flammealis, 111
Endromis versicolor, 114, 145, 154, 327
Ennomos autumnaria, 297, 317; erosaria, 100; fuscantaria, 73; tiliaria, 73
Ennychia nigrata, 74
Enodia (Epinephele) hyperanthus, 23; portlandica, 23, 326
Enoplops scapha, 325
Entomological expedition to Himalayas, 123
Epacromia tamulus, 188
Ephestia kühniella, 146
Ephipphiphora brunnichiana, 72
Ephyra omicronaria, 73; pendularia, 71; punctaria, 72
Epichnopteryx reticella, 114, 222
Epinephele hyperanthus, 248, 275,—var. (figs.), 49; ianira, 94,—var. hispulla, 10, 212; ida, 11; tithonus, 212, 295, 323, 326,—var. (fig.), 253, 254
Epione advenaria, 110, 116, 226, 246; apiciaria, 37, 67; parallelaria, 37, 317
Epunda nigra, 111, 113
Erebia æthiops, 149; blandina, 96; epiphron var. cassiope, 211; euryale var. euryaloides, 211; gorge, 211; ligea, 149; manto var. cæcilia, 211; melas, 211; nerine, 275; tyndarus, 211; zapateri, 324
Eriocephala allionella, 201
Eriogaster lanestris, 252
Erirrhinus bimaculatus, 227
Eristalis tenax, 274
Erythromma najas, 35, 283,—(fig.), 29
Essex—Captures in, 273; Colias edusa, 269; Epichnopteryx reticella, 222; Hadena dissimilis, 224; notes from Southend, 114; Strenia clathrata, 269
Eubolia bipunctaria, 22; cervinaria, 111
Eucerceris vittatifrons var. tricolor, 136
Eucheira socialis, 44
Euchlæna prunaria, 245
Euchloë cardamines, 19, 322,—var. turritis, 6, 9; belia var. ausonia, 6, 9,—var. simplonia, 6, 9
Eucosmia certata, 116, 315; undulata, 315
Eudæmonia argiphontes, 201; brachyura, 201
Eudorea cembræ, 72
Eugonia angularia, 329; alniaria, 58, 115; autumnaria, 271; erosaria, 59, 67, 94; fuscantaria, 48, 59, 100, 318; quercinaria, 59, 318
Eumolpidæ, new species of South American, 168, 193, 216
steria heparata, 227
Eupithecia abbreviata, 112; albipunctata, 145, 288; assimilata, 73; consignata, 85, 287; coronata, 73, 145, 190; debiliata, 290; dodoneata, 289; expallidata, 288; fraxinata, 145, 287; helveticaria var. arceuthata, 238; indigata, 287; innotata, 287; isogrammata, 237; jasioneata, 286; lariciata, 74, 288, 320; linariata, 74, 237; oblongata, 74, 237; pimpinellata, 287; plumbeolata, 72, 238; pulchellata, 69, 237, 251; pumilata, 270; pygmæata, 238; rectangulata, 108; satyrata var. curzoni, 224; scabiosata, 237; subciliata, 145; subfulvata, 48, 173, 237; subnotata, 85, 288; succentaureata, 73, 74, 237; sobrinata, 73; togata, 22, 289; trisignaria, 287; valerianata, 287; venosata, 145, 237; virgaureata, 74, 287
Euplœa core, 241; rhadamanthus, 241; rogenhoferi, 241
Eupœcilia angustana, 273; atricapitana, 114; nana, 199
Eurhipidæ, 170
Eurrhypara urticalis, 242
Eurymene dolobraria, 38, 108, 110, 145, 246
Eustroma reticulata, 150
Euteliidæ, 171
Exhibition of insects, 179, 316
"Experiences in Lepidoptera in 1896," 87

Forcing Acherontia atropos, 75
Formicidæ from St. Vincent, &c., 148
Frenulum of the Lepidoptera, 300
Fungi parasitic on butterflies (figs.), 1
Fungi *versus* Androconia, 50

Gelechia affinis, 72; dodecella, 74; domestica, 73; fugitivella, 73; luculella, 72; mulinella, 74; proximella, 72; spuricella, 22; tæniolella, 74; vulgella, 72, 73
Genera of Lepidoptera, monograph of the, 297
Geographical distribution and postglacial derivation of the Palæarctic and Nearctic Alpine Rhopalocera Fauna, 157
Geographical varieties, on naming, 26
Geometra papilionaria, 112, 129, 145, 251, 327; vernaria, 116, 129, 226, 249
Geometridæ, Asiatic distribution of British, 244, 312; from Europe and E. Asia compared, 150
Geranomyia unicolor, 95
Gloucestershire—Agrotis cinerea, 115 (*c.f.* 145); Lycæna arion, 220; Setina irrorella, 247
Glyptoscelis gigas, sp. n., 262; paraguayensis, sp. n., 263
Gnophos obscurata, 109, 128
Gnophria rubricollis, 224

Gomphocerus maculatus, 28
Gomphus vulgatissima, 34
Gonepteryx cleopatra, 9, 94; rhamni, 9, 16, 17, 107
Gortyna flavago, 94
Gryllotalpa africana, 188; gryllotalpa, 188; vulgaris, 20
Gymnopleurus, Illiger, on the genus, 131; the genus, 62, 166
Gynandromorphous earwigs, 201, 203
Gynandromorphous Lepidoptera:—174; Argynnis (Dryas) paphia, 178; Dicranura bifida, 295; Lycæna ægon, 179; icarus; 179, 296; Melanargia galatea, 150; Saturnia pavonia, 22

Habrostola tripartita, 116; triplasia, 116, 145
Hadena dissimilis, 116, 224; genistæ, 116, 224; glauca, 252; maillardi a form of Crymodes exulis, 178, 179; pisi, 275; thalassina, 23; trifolii, 271
Halia brunneata, 214, 246
Halias prasinana, 109; quercana, 109
Halonota cirsiana, 72
Halticid beetle, a remarkable, 147
Hampshire — Cicadetta montana, 148; Colias edusa, 269, 299; collecting in New Forest, 224; Diptera at Bournemouth, 95; Ennomos (Eugonia) autumnaria, 271, 297; notes from Ringwood, 107
Hecatera serena, 110, 115, 116, 327
Heliophobus hispidus, 321
Heliothis dipsacea, 108; peltigera, 85, 327
Helophilus trivittatus, 328
Helotropha fibrosa, 80
Hemerophila abruptaria, dark var., 154
Hemithea strigata, 129
Hepialus daphnandri, 324; lupulinus, 86,—vegetable enemy of larva, 162; sylvanus, 110
Herminia barbalis, 71; cribralis, 114; tarsipennalis, 111
Hesperia actæon, 7, 11, 212; lineola, 114, 212, 329; nostrodamus, 7, 11; paniscus, 111; sylvanus, 19, 212
Hessian fly, parasite of, 317
Heterogamia ægyptiaca, 188
Heterogenea limacodes, 275
High-flat setting, 14, 15, 45, 76, 77, 119, 142
Himera pennaria, 246
Homœochromatism in butterflies, 201
Homœosoma cretacella, 273; senecionis, 273
Hybernia aurantiaria, 18, 73, 85, 153; defoliaria, 18, 234; dira, 246; leucophæaria, 233, 246; marginaria, 178, 234; progemmaria var. fuscata, 320
Hybrid Amphidasys strataria × A. betularia, 179
Hybrid and mongrel Lepidoptera, 197
Hybrids and mongrels, 176, 300
Hydrelia uncula, 227
Hydrilla palustris, 222
Hydrocampa nymphæata, 242; stagnata, 74, 242
Hydrocampinæ, 147, 242
Hydrœcia micacea, 48, 145, 319; nictitans, 20, 48,—var. paludis, 114
Hygrochroa syringaria, 245
Hymenoptera from New Mexico, 135
Hypenodes costæstrigalis, 37, 74
Hyperchiria io, 43
Hypsipetes impluviata, 111, 227, 251; ruberata, 111, 312; trifasciata, 145
Hyria muricata, 129

Icerya rileyi, 14
Ichneumon on young larva of Cucullia verbasci, 203
Idia lunata, 95
Ino geryon, 116; statices, 116
Insects, the senses of, 11
Iodis lactearia, 129; vernaria, 108 109
Ireland—Catalogue of the Lepidoptera of, 36, 58, 104, 128, 212, 233, 286, 310; Aciptilia tetradactylus, 85; Larentia flavicinctata, 297; Leucania extranea, 80; Leucophasia sinapis, 200; Platyptilia tesseradactyla, 74; Phothedes captiuncula, 85
Ischnura elegans, 35, 70, 251, 282; pumilio, 35
Isle of Man—Colias edusa, 269
Ismene helios, 152
Ivy, captures at, 113
Ixias birdi, 241

Jumping beans, 23, 93

Kent—Colias edusa, 269, 321; Endromis versicolor, 154; Pieris daplidice, 299; Plusia moneta, 221; orichalcea, 180
Kermes gillettei, 14; variegatus, 300

Labidura pugnax, 201
Lancashire — Acherontia atropos, 298, 322; Acronycta alni, 298
Laphygma exigua, 327
Larentia berberata, 108; cæsiata, 235; flavicinctata, 297, 325; miaria, 74; multistrigaria, 235; olivata, 235; salicata, 235, 274
Lasiocampa quercifolia, 48, 110,—number of eggs, 24
Lecaniodiaspis celtidis, 12
Leioptilus (Alucita) scarodactyla, 22
Lepidoptera, aberrations of British, 144; Gynandromorphous, 174; in 1896, 107; in 1897, 176, 322; of Ireland, catalogue of the, 36, 58, 104, 128, 212,

233, 286, 310; of Middlesex, 198; the protection of, 229, 232; list of species to be protected, 198; uniformity in pinning and setting, 77, 174; phalænæ of the whole world, 264
Lepidopterous pupæ, questions connected with the formation of, 24
Leptogramma scabrana, 146
Leptophyes punctatissima, 28
Leptura livida, 224
Lestes nympha, 35; sponsa, 35, 70, 201, 282
Leucania albipuncta, 327; comma, 116, 145; extranea, 80; littoralis, 108, 109; obsoleta, 273, 275; straminea, 114; turca, 110; unipuncta migrating, 78
Leucoma salicis, 273, 327
Leucophæa surinamensis (indica), 178
Leucophasia sinapis, 58, 200, 209
Leucorrhinia dubia, 70, 251, 296
Leuctinodes longipalpis, 126; vagans, 126
Libellula depressa, 272, 273; fulva, 52; quadrimacula, 32, 180, 251, 272, 277, 278, 280
Libythea celtis, 10
Ligdia adustata, 72, 111, 216
Limenitis camilla, 10, 210; sibylla, 102, 108, 109, 202
Limnobia replicata, 148
Lincolnshire—Sphinx convolvuli, 298
Liparis dispar, effects of inbreeding, 24
Lita intermediella, 83
Lithocolletis messaniella, 72; quercifoliella, 72; scopariella, 71; sylvella, 71; ulmifoliella, 72
Lithosia aureola, 108, 222; caniola, 328; complana, 114; mesomella, 108, 115, 226; sericea, 110; sororcula, 145; rubricollis, 108
Lithostege griseata, 275
Lobesia reliquana, 71
Lobophora carpinata (lobulata), 250, 310; halterata, 310; hexapterata, 71; sexalisata, 111, 310; viretata, 111, 113, 145, 310
Locusta peregrina, 23; undetermined species, 84; viridissima, 28, 326
Lophopteryx camelina, 69, 297; carmelita, 180
Lophyrus pini, 95, 297
Lozogramma petraria, 246
Luehdorfia puziloi, 152
Luperina cespitis, 67, 94, 96, 113, 116; testacea, 113
Lycæna agon, 210; argiolus, 10, 108, 112, 116, 180, 241, 248, 322; argus, 210; arion, 57, 87, 103, 139, 210, 220; astrarche, 10, 114, 210; baton, 10; bellargus, 10, 80, 210; bœtica, 9; coryden, 81, 210; cyllarus, 6, 10; eros, 210; escheri, 210; eumedon, 210; hylas, 210; icarus, 10, 210, 322—? hybrids, 95; minima, 210; orbitulas, 210; semiargus, 210; webbiana, 94
Lytra vesicatoria, 324

Macaria alternata, 246; liturata, 74, 111, 213, 250; notata, 71, 72; shanghaisaria, 246
Macroglossa bombiliformis, 108, 115, 116, 179, 219, 225, 226; fuciformis, 108, 115, 219; stellatarum, 116, 249, 292, 323
Mamestra abjecta, 114, 274; albicolon, 249; anceps, 48, 72; persicariæ (black), 23; sordida, 145
Mantis, living in confinement, 202; religiosa, 188
Meconema varium, 28, 76
Melampias melampus, 23; pharte, 23
Melanargia arge, 6; galatea, 6, 10, 114, 116, 150, 211,—var. procida, 8, 10; japygia, 6,—var. cleanthe, 8, 10; pherusa, 5, 10,—var. plesaura, 10
Melalontha vulgaris, 154
Melanippe galiata, 108, 153; hastata, 150, 316; montanata, 266, 274; procellata, 72, 146; rivata, 74, 146, 153; unangulata, 74, 111
Melanism and climatic conditions, 127, 197, 219
Melanthia albicillata, 111; rubiginata, 74
Melinda formosa, 165
Melissodes menuacha var. submenuacha, 137
Melitæa artemis, 94; athalia, 10, 103, 210; aurinia, 57, 103, 116, 324; cinxia, 10, 58, 223; dictyma, 7, 10, 210; didyma 7, 10, 210; parthenie, 210; phœbe, 210
Merodon equestris, 227
Metrocampa dolabraria, 246; pulveraria, 245
Micro-Lepidoptera from Dauphine Alps, 22; from Equatorial Africa, 22; in 1897, 322
Micropteryx sparmannella, 71
Middlesex—Amphidasys betularia var. doubledayaria, 200; Lepidoptera of, 198; Lycæna argiolus at Chiswick, 248; Phorodesma pustulata, 222; Sphinx convolvuli, 270
Miltogramma conica, 95; punctata, 95
Mimesa bicolor, 275
"Mimetic attraction," 177
Mimicry, 201, 328
Minoa murinata, 116
Molorchus minor, 180
Molophilus murinus, 275
Morgeni mercedonia, 165
Moth-trap in 1896, illuminated, 145
Mould, formaline as a preventive of, 21
Mullerian mimicry, 201, 328

Muscular energy in a Tipula leg after death, 275
Mymaridæ, British, 264
Myochrous curculionoides, sp. n., 263
Myopa fasciata, 95

Natural genera and the nature of species, 151
Nemeobius lucina, 116
Nemeophila plantaginis, 116, 252, 329; russula, 20, 250
Nemoria viridata, 110, 129
Nephrocerus flavicornis, 84
Nest of Bombus latriellellus, of B. lapidarius, and of Vespa rufa attacked by larvæ of Aphomia sociella, 274
Neuration without removing scales, studying, 265
Neuria saponariæ, 48
Neuronia popularis, 67, 94, 116, 319
Nisoniades tages, 19
Noctua castanea, 145, 299; dahlii, 110; glareosa, 299; plecta, 73; sobrina, 23; umbrosa, 67; xanthographa, 67
Noctuid moths, synonymy of, 170
Nola confusalis, 72; cucullatella, 110, 226; strigula, 110
Notiophilus rufipes, 324
Nonagria arundinis, 326, 327; fulva, 110; lutosa, 114; neurica, 273
Notodonta camelina, 73; dictæa, 48; dictæoides, 113; dromedarius, 69; trepida, 145, 327; trimacula, 145; ziczac, 299
Notonecta glauca, 201; lutea, 201
Notonectidæ, preliminary revision of the, 300
NOTTINGHAMSHIRE — Sphinx convolvuli, 270
Nudaria mundana, 145; senex, 110
Numeria pulveraria, 204, 245
Nymphula stagnata, 242
Nyssia hispidaria, 145, 152, 154, 225, 250; lapponaria, 179; zonaria, 59, 68, 86, 87

Oberea oculata, 274
OBITUARY—Hodgkinson, J. B., 124; Fry, Clarence, 156; Finlay, John, 228; Matthews, Andrew, 276; Dunning, Joseph William, 332; McArthur, 332
Ochsenheimeria bisontella, 74; vaculella, 299
Ocneria dispar, 153
Odynerus livipes, 152
Œcophora stipella, 22
Œdipoda cærulescens, 28; fasciata, 23
Œdipodidæ, 148
Onocera ahenella, 146
Oodes helopioides, 180
Ophion luteum, 122
Opisthograpta clathrata, 246; alternaria, 246
Opomala cylindrica, 188
Oporabia autumnaria, 234; dilutata var. obscurata, 234; filigrammata, 234
Oporina croceago, 94, 112, 113
Orgyia antiqua, 115; dispar, 87; fascelina, 108, 109; gonostigma, 327
Ornithoptera pompeus, 241; (Pompeoptera) irregularis, sp. n., 312
Ornix anglicella, 71
Orthetrum cancellatum, 281; cærulescens, 271, 281
Orthoneura brevicornis, 152
Orthoptera, British, 28, 76; exotic, 23, 187, 327
Orthosia upsilon, 273
Orthotænia striana, 146
OXFORDSHIRE—Colias edusa, 248
Oxylebius legolesius, 329

Pachnobia hyperborea (alpina), 149
Pachycnemia hippocastanaria, 111
Pædisca occultana, 146
Paniscus cephalotes, 122
Panolis piniperda, 117
Pantilius tunicatus, 326
Papilio ganesa, 241; machaon, 9, 23, 95, 102, 208,—var. sphyrus, 9; mimeticus, sp. n., 165; paris, 241; podalirius, 9,—var. feisthamelii, 95,—var. latteri, 95,—var. zanclæus, 9, 95; rex, 165; new species from Uganda, 165
Papilionidæ of the Machaon group from N. America, 147
Paragymnopleurus, gen. nov., 166
Paraponyx stratiotalis (stratiotata), 67, 73, 74, 242
Pararge egeria, 10, 19, 112, 116, 123, 212, 248, 319, 322; mæra var. adrasta, 211; megæra, 10, 19, 212,—var. tigelius, 10; xiphia, 94; xiphioides, 94
Parasite in larva of Melitæa aurinia, 203
Parnassius apollo, 208, 324; geographical varieties of, 15
Passalus, stridulating apparatus in, 151
Pechypogon barbalis, 224
Pelurga comitata, 73
Pempelia palumbella, 111
Penthina betulætana, 146; gentiana, 273
Pericallia syringaria, 20, 108, 110, 116, 245
Perinephele lancealis, 242
Periplaneta americana, 142; monochroma, 188
Peronea cristana, 146; mixtana, 146; permutana, 220, 274; schalleriana, 146
Petasia cassinea, 112
Phalera bucephala, 299
Phibalapteryx lignata, 67; tersata, 95, 107; vitalbata, 72, 95, 111, 116
Phigalia pedaria, 145, 247; pilosaria, 72; sinuosaria, 247

Philosamia cynthia, 43; splendidus, 43
Phlœodes demarniana, 199; immundana, 146
Phorodesma bajularia, 202, 224,—larva (fig.), 301: pustulata, 222,—larva (fig.), 301; smaragdaria, 202
Phothedes captiuncula, 85
Photography without shadow, 265
Photopsis mesillensis, sp. n., 137
Phoxopteryx lactana, 72; uncana, 199
Phycis betulæ, 199
Phyllocrania illudens, 300, 325
Phyllodromia germanica, 142
Phytometra ænea, 108
Pieris brassicæ, 9, 19, 56, 94, 108, 241, 324; attracted by artificial flowers, 197; callidice, 209; cheiranthi, 94; daplidice, 9; melete, 276; napi, 19, 56, 209, 241; rapæ, 9, 19, 56, 107, 209, 241, 266
Pigments of Lepidoptera, the probable cause and physical nature of the, 51
Pionea stramentalis, 74
Plagithmysus from the Hawaiian Islands, species of, 21
Platetrum depressum, 32, 278, 280; quadrimaculata, 70
Platycleis brachyptera, 28, 76; roselii, 28
Platycnemis pennipes, 35, 282
Platypezidæ, British, 221
Platypteryx lacertula, 108; unguicula, 108
Platyptilia tesseradactyla, 74, 84, 86
Platysamia ceanothi, 42; cecropia, 42; columbia, 42; gloveri, 42
Plebius (Lycæna) ægon, 275
Pleurota pyropella, 22
Plusia bractea, 20; chrysitis, 67, 110, 116: festucæ, 67, 110, 273; gamma, 271; iota, 73, 110, 116, 145; moneta, 221, 271, 298, 324; orichalcea, 180; pulchrina, 110
Pœcilocampa populi, 68, 72, 115, 116
Pœcilochroma ratzeburghiana, 74
Polia chi var. olivacea, 22, 68; flavicincta, 95, 326
Polygonia c-album var. hutchinsoni, 16; comma, 172; interrogationis, 172
Polyommatus corydon, 274, 275; dispar, 102; hippothoë, 80; phlœas var. eleus, 9
Porthesia auriflua, 20; (Euproctis) chrysorrhœa, 20, 230, 232, 316
Prays curtisellus, 73, 273
Protection of insects, 18, 144, 146, 148, 150, 198, 229, 232
Prothoracic gland of D. vinula, 147
Protopassus walkeri, 300
Psamotis hyalinalis, 242; pulveralis, 242
Psecadia pusiella, 21
Pseudopanthera bimaculata, 245; petraria, 246
Pseudopontia paradoxa, 178
Pseudoterpna pruinata, 129, 250
Psilura monacha, 108, 226
Psyche cases, 327
Pterostoma palpina, 48
Ptocheuusa inopella, 273
Pulvinaria innumerabilis var. occidentalis, 13
Pycnoscelus indicus, 21, 28
Pyralis glaucinalis, 72, 74
Pyrisitia proterpia, 202
Pyrrhosoma minium, 35, 29 (fig.), 149, 271, 273, 277, 283; tenellum, 35, 278, 283

Ranatra vicina, 188
RECENT LITERATURE:—
'The Hemiptera-Homoptera of the British Islands,' by Jas. Edwards, 123
'The Lepidoptera of the British Islands,' vol. iii., by Charles G. Barrett, 124
'Economic Entomology for the Farmer and Fruit-grower, and for use as a Text-book in Agricultural Schools and Colleges,' by John B. Smith, 124
'Proceedings of the Eighth Annual Meeting of the Association of Economic Entomologists,' 124
'Bibliography of the more Important Contributions to American Economic Entomology,' by Samuel Henshaw, 124
'Proceedings of the South London Entomological and Natural History Society, 1896,' 154
'Report of Observations of Injurious Insects,' by Eleanor A. Ormerod, 155
'Notes on Lepidoptera collected in the Edinburgh District,' by William Evans, 155
'Preliminary List of the Neuroptera and Trichoptera of Yorkshire,' by G. T. Porritt, 155
'Imaginal Discs in Insects,' by Henry S. Pratt, 155
'A New Hypothesis of Seasonal Dimorphism in Lepidoptera,' by A. G. Mayer, 156
'Ichneumonides d'Afrique,' by J. Tosquinet, 156
'Le Cocciniglie Italiane,' by Antonio Berlese, 156
'A Check-List of the Coccidæ,' by T. D. A. Cockerell, 156
'The Principal Household Insects of the United States,' by L. O. Howard and C. L. Marlatt, 156

'Insects affecting Domestic Animals,' by Herbert Osborn, 156
'Insects affecting the Cotton Plant,' by L. O. Howard, 156
'An Essay on the Development of the Mouth-parts of certain Insects,' by John B. Smith, 156
'New Mallophaga' (Pt. II.), by Vernon L. Kellogg, 156
'Die Schmetterlings fauna von Hildesheim,' by A. Radcliffe Grote, 203
'The Young Beetle Collector's Handbook,' by E. Hofmann and W. Egmont Kirby, 204
'A Study in Insect Parasitism,' by L. Howard, 228
'Harrow Butterflies and Moths,' Vol. II., by J. L. Bonhote and N. C. Rothschild, 228
'Descriptive List of British Anthomyidæ,' by R. H. Meade, 252
'The Asparagus Beetle,' by F. H. Chittenden, 276
'Some Little-known Insects affecting Stored Vegetable Products,' by F. H. Chittenden, 276
'The San Jose Scale and its Nearest Allies,' by T. D. A. Cockerell, 276
'Insect Control in California,' by C. L. Marlatt, 276
'General Index to Insect Life,' 276
'Life Histories of American Insects,' by Clarence Moores Weed, 330
'Report of the State Board of Agriculture on the Work of Extermination of the Gipsy Moth,' 330
'Proceedings of the Davenport Academy of Natural Science,' 330
'Biological Effects of Civilization on the Insect Fauna of Ohio,' by F. M. Webster, 330
'The Protective Value of Action, Volitional or otherwise, in Protective Mimicry,' by F. M. Webster, 330
'The Food Plants of Scale Insects (Coccidæ),' 330
'Further Coccid Notes,' by W. M. Maskell, 330
'Investigations on the San Jose Scale,' by John B. Smith, 331
'Directions for Collecting and Preserving Scale Insects (Coccidæ),' by T. D. A. Cockerell, 331
Reports of Societies:—
Birmingham Entomological, 152, 252, 275, 327
Cambridge Entomological and Natural History, 23, 93, 151, 178, 328
City of London Entomological and Natural History, 179
Entomological Club, 96
Entomological Society of London, 20, 82, 146, 177, 201, 300, 323
Lancashire and Cheshire Entomological, 87
Nonpareil Entomological and Natural History, 24, 153, 180, 329
North London Natural History, 96, 224
South London Entomological and Natural History, 22, 84, 148, 177, 202, 224, 274, 325
"Representative species," 150
Retinia buoliana, 74, 199; pinicolana, 199; pinivorana, 200; resinella, 149, 202
Rhinonchus bruchoides, 180
Rhodocera rhamni, 209
Rhodophæa advenella, 146, 273; consociella, 146
Rhynchota, synonymic notes on aquatic, 258
Rivula sericealis, 67
Roxana arcuana, 71, 74

Salius fuscus, 275
Satacoma agrionata, 300
Saturnia carpini, 20, 22, 110, 226, 249; cœcigena, 40; gelleta, 44; isabellæ, 40; laventera, 44; orizaba, 44; pavonia, 22, 202; vorulla, 44; zacateca, 44
Satyrus alcyone, 211; circe, 10; prieuri var. uhagonis, 324; semele, 266, 275,—in cop. with V. atalanta, 249,—var. aristæus, 7, 8, 10; statilinus var. allionia, 10
Sarrothripa revayana, 109
Scerropinus fenestralis, 93
Schistocera peregrina, 84
Scilly Isles—Colias edusa, 269; Lepidoptera of, 82
Scodonia belgiaria, 108, 214, 226, 252
Scoparianæ, British, 242
Scoparia pallida, 73, 114
Scoria dealbata, 215
Scotland—Colias hyale, 178; Epione parallelaria, 317; Lepidopteria of Aviemore, 149; Setina irrorella, 81; Sphinx convolvuli, 298
Scotosia certata, 111; undulata, 111
Seasonal dimorphism in African butterflies, 84
Selenia illustraria, 110; lunaria, 38, 110, 116, 145; tetralunaria, 39, 245
Selidosema ericetaria, 215; plumaria, 109
Senta maritima var. bipunctaria, 114,—var. wismariensis, 275
Sericinus telamon, 152
Sericoris rivulana, 22
Sesia culiciformis, 200,—yellow band, 23; musciformis, 111, 222; tipuliformis, injurious, 173

Setina aurita 247; irrorella, 81, 95, 174, 247
Sigara (Rhynchota), notes on the genus, 238
Silk-producing Lepidoptera, 39
Sirex gigas, 252; juvencus, 24
Smerinthus ocellatus, 22, 69, 299, 319; populi, 19, 69, 72, 116, 274, 319; tiliæ, 23, 71, 116, 319
Some thoughts suggested by Mr. Harcourt-Bath's paper, 184
Sophronia semicostella, 22
Sphecodes niger, 152
Sphegidæ from Egypt, 202
Spider catching Vanessæ, 21
Spiders from the Canaries and Madeiras, 95
Spilosoma fuliginosa, 48, 68, 145, 250; pairing with A. caia, 247; lubricipeda, 22, 84; mendica, 20,—var. rustica, 205; menthastri, 274
Spilomena foxii, sp. n., 136
Spilomyia speciosia, 227
Spilonota rosæcolana, 72
Spilothyrus alceæ, 11; altheæ, 11, 212; lavateræ, 212
Sphinx convolvuli, 219, 223, 270, 298, 321, 323; ligustri, 95, 115, 116, 299, 319; pinastri, 222
Sphinigymnopleurus, gen. nov. 166
Stauropus fagi, 115, 270, 271, 297
Stenia punctalis, 242
Stenobothrus elegans, 28
Stenoprocus cruciatus, 177
Sterrha sacraria, 215
Stilbia anomala, 109
Strange resting-place of butterflies, 266
Strangalia melanura, 224
Strenia clathrata, 213, 246, 269
Stridulating apparatus of Geotrupes, 151; in a Passalus, 151
Suffolk—Acherontia atropos, 122, 247, 269; Chœrocampa elpenor, 247; Lepidoptera in, 70; notes from Eastern Counties, 73; Sphinx convolvuli, 270
Surrey — Amyhidasys betularia var. doubledayaria, 222; Anosia menippe, 18; Plusia moneta, 221, 271; Whit Monday at Oxshott, 299
Sussex—Colias edusa and C. hyale, 269; Peronea permutana, 220; Pycnoselus indicus, 21; Velia currens, 148
Swammerdamia cæsiella = spinella, 72
Sympetrum flaveolum, 32; fonscolombii, 32; sanguineum, 32; scoticum, 32, 70, 280, 281, 321; striolatum, 280, 281, 321; vulgatum, 32
Synchloe lacinia, 324
Synonymy of the British species of Scoparia, 243
Syrichthus alveus, 212; carthami, 212; malvæ ab. taras, 324; sao, 212
Syrphidæ, 226
Tabanus spodopterus, 93
Tæniocampa gothica var. gothicina, 203; gracilis, 119; incerta, 23; miniosa, 107, 225; munda, 71, 85, 117; in cop. with T. stabilis, 85; opima, 153, 327; populeti, 117, 176; rubricosa, 119
Talæporia pseudobombycella, 146
Tapinostola elymi, 275; bondii, 75, 256, 303, 318
Teinopalpis imperialis, 242
Telea polyphemus, 41
Tellena angusticollis, sp. n., 261
Temperature experiments, 175, 196, 300
Tephrina brunneata, 246
Tephrosia bistortata, 20, 148, 149, 300,—ab. abietaria, 20,—ab. consonaria, 20; biundularia, 20, 85, 95, 105, 108, 110, 116, 250,—on the Irish, 140; biundularia and crepuscularia (bistortata), ova of, 149; consonaria, 105, 111, 116; crepuscularia, 85, 95, 105, 107, 110, 115, 178, 202, 203, 300, 313, 320, 322; extersaria, 108, 111; punctularia, 71, 128
Tephrosia discussion, The, 140, 202
Termites, remarks on, 152
Tethea subtusa, 94
Tettix bipunctatus, 28
Thais cerisyi var. deyrolii, 149
Thalpochares parva, 47 (Micra); paula, a British species, is, 17, 47
Thamnotrizon cinereus, 28
Thecla acaciæ, 9; betulæ, 108, 109, 123; ilicis, 209; pruni, 153; quercus, 225; rubi, 19, 108
Thera firmata, 111, 312; juniperata, 149, 311; simulata, 149; variata, 311
Tholomiges turfosalis, 37
Thyatira derasa, 249
Timarcha lævigata, 272
Tinea biselliella, 21, 72; cloacella, 71; cochylidella = ruricolella, 143; ferruginella, 73; fuscipunctella, 73; semifulvella, 145
Tischera complanella, 71
Tortrix piceana. 200; pyrastrana, 45; ribeana, 73; viburniana, 114
Toxocampa craccæ, 274
Trachea piniperda, 107
Trichiura cratægi, 95, 112, 116, 145, 323
Trichonyx sulcicollis, 324
Triphæna comes, 85; fimbria, 84; interjecta, 110
Tryxalis pharaonis, 188

Urania rhipheus, 178
Urapteryx sambucata, 245, 252
Urodera lacordairei, sp. n., 261

Vanessa atalanta, 10, 18, 56, 94, 210, 241; antiopa, 48, 95, 210, 269; c-album, 10, 19, 82, 210 (Polygonia), 172,—var. hutchinsoni, 16, 87; callirhoë,

94; cardui, 7, 10, 56, 94, 210, 242, 299; huntera, 94; io, 19, 94, 107; polychloros, 7, 10, 108, 109; urticæ, 68, 107, 210, 241,—var. ichnusa, 10
Variation of Callimorpha dominula, 294
Varieties.—Abraxas grossulariata, 21, 22, 73, 111, 150, 271, 325; sylvata, 85, 325; Acronycta menyanthidis, 85; Agrotis segetum, 85; Amphidasys prodromaria, 93; Anchocelis rufina, 150; Angerona prunaria, 254; Apatura iris, 94; Arctia caia, 94, 95, 150, 326; Argynnis adippe, 326; (Dryas) paphia, 23; Doritis apollinus, 152; Camptogramma bilineata, 179; Catocala nupta, 79, 266; Cerastis vaccinii, 152; Colias chrysotheme, 296; Epinephele hyperanthus, 328; ianira, 179, 326; tithonus, 326; Erebia goante, 254; Fidonia atomaria, 96; Hemerophila abruptaria, 154; Hepialus humuli, 67; Hybernia marginaria, 178; Leucorrhinia dubia, 296; Limenitis sibylla, 179; Lycæna corydon, 81, 327, 329; minima, 179; Melanargia galatea, 323; montanata, 236; Nemeophila plantaginis, 266, 300; Noctua c-nigrum, 85; Odonestis potatoria, 22, 85, 322; Pararge egeria, 179, 254; Phigalia pedaria, 147, 150; Pieris brassicæ, 324; rapæ, 294; Pyrameis cardui, 179; Saturnia carpini, 85; Spilosoma fuliginosa, 95; Smerinthus populi, 326; tiliæ, 295; Tæniocampa cruda, 85; gracilis, 151; munda, 85; Triphæna pronuba, 85; Vanessa atalanta, 18, 196; antiopa, 196; io, 196; levana, 196; urticæ, 179, 295, 324; Xylophasia rurea, 85; Zygæna filipendulæ, 24
Velia currens, 148, 176
Velleius dilatatus, 324
Venusia cambrica, 130
Vespa britannica, 180; crabro, 123, 267; rufa, 274; vulgaris, 123
Vespæ during hybernation, 152

Wales—Acronycta alni, 176; Agrotis cinerea, 81; Bombyx neustria, larva abundant, 200; Colias edusa, 299; Dianthæcia luteago, 222; Entomology in Merionethshire, 248, 271; Macro-Lepidoptera of the Conway Valley, 19; Rhopalocera at Llandudno, 272; Vanessa c-album, 81
Warwickshire—Dragonflies around Birmingham, 272; Sphingidæ of Birmingham district, 219
Wicken Fen, 220
Wiltshire—Sphinx convolvuli, 270
Wingless moths, 44
Worcestershire—Coleoptera in 1897, 299; Sphinx convolvuli, 298

Xanthia aurago, 95, 145, 320; citrago, 73; gilvago, 116
Xanthogramma ornata, 95
Xanthosetia zœgana, 74
Xiphidium dorsale, 28
Xylina ornithopus, 116; petrificata, 112, 113; rhizolitha, 73, 110, 113

Yorkshire—Sallows in 1896, 116; Sphinx convolvuli, 298; Vanessa antiopa, 269

Zanclognatha grisealis, 67
Zeugophora flavicollis, 83
Zeuzera æsculi, 48, 110; pyrina, 115
Zonosoma linearia, 129; pendularia, 129, 145; punctularia, 129; orbicularia, 115, 129
Zygæna exulans, 23; filipendulæ, 108,—var. hippocrepidis (fig.), 181, 224; loniceræ, 116; ochsenheimeri × with Z. filipendulæ, 83; trifolii, 108, 116

ILLUSTRATIONS.

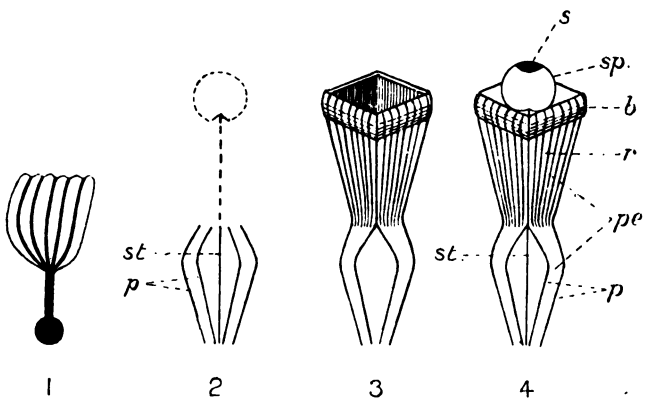
		PAGE
FUNGI PARASITIC ON BUTTERFLIES		1
ABRAXAS GROSSULARIATA VARS.		25
EPINEPHELE HYPERANTHUS VARS.		49
ANISOLABIS ANNULIPES, LUCAS		125
CORDYCEPS ENTOMORRHIZA (VEGETABLE ENEMY OF HEPIALUS LUPULINUS LARVÆ)		162
ZYGÆNA FILIPENDULÆ VAR. HIPPOCREPIDIS		181
EPINEPHELE TITHONUS VAR.		253
AGRION MERCURIALE (MALE AND FEMALE)	PLATE I. *To face*	277
ANAX FORMOSUS (NYMPH)	PLATE I. *To face*	277
CALOPTERYX SPLENDENS (NYMPH)	PLATE I. *To face*	277
PHORODESMA PUSTULATA (BAJULARIA) LARVÆ		301

THE ENTOMOLOGIST

VOL. XXX.] JANUARY, 1897. [No. 404.

FUNGI PARASITIC ON BUTTERFLIES.

BY J. C. RICKARD.



ON page 314 of the October number of the 'Entomologist' is a paragraph relating to this subject, entitled "Fungi or Androconia?" by Prof. J. B. Smith. In referring to Mr. Scudder's great work on Butterflies he characterises it as "magnificent." I regret not having had an opportunity of reading it, but am aware of its comprehensiveness, and through the kindness of a friend have been able to consult some of the plates. In a work of this magnitude it is not surprising that errors should creep in, but in spite of some mistakes I shall continue to regard it as "most magnificent" until I meet with a better work on the subject.

Prof. Smith refers me to plate 47, figures 1 and 2, which he states *represent* something "as nearly like a spore-formation

in some kinds of fungus as can well be imagined." As those figures do not present any very striking fungoid characters, I think he must have meant plate 46, where figures 1 to 4 represent organisms similar to those found on some Satyrids. Prof. Smith goes on to say that he has "found his (Mr. Scudder's) pictures in every case absolutely correct."

Figure 4 on plate 44 represents a portion of the wing of *Speyeria idalia;* the objects in this figure that Mr. Scudder terms "feathered androconia" are really the rhizoids of a fungus, either represented from the under side, or else showing through the transparency of the overlying scales. Figures 39 and 40 of plate 46 are said to represent the androconia of *Pieris oleracea* and *P. rapæ*, but both figures are taken from mutilated or imperfectly developed examples. Of figure 40 (*rapæ*) I can speak positively from my own observation; whilst the *oleracea* example so closely resembles the parasite of *P. napi*, that I have not the least doubt of its imperfect condition; certainly, many examples, both of the *rapæ* and *napi* forms, minus their sporocarps, have come under my notice; but I have invariably found some on every slide examined in which this organ, the most important part, was developed and *in situ*. Figure 42 of the same plate is said to represent the androconia of *Laertias philenor;* this form differs from all the others figured by Mr. Scudder, and, speaking with reserve, I must say that in my opinion it represents an imperfect example. One would hardly suppose the vertical lines represented the striæ of an ordinary scale; neither do they; one of these lines represents the stem that bears the sporocarp, the remaining four are the ribs or paraphyses (figure 1). I have very little doubt that the figure represents the basal portion * of the peridium, the stem and sporocarp of a fungus nearly allied to that found on *P. agathina* (see *ante*, p. 171). Similar mutilated examples of the *agathina* fungus have come under my notice (figure 2).

My efforts to learn something of the later phases in the development of the *rapæ* fungus were only partially successful; the first male of this species procured this year had never used its wings in flight, its fungi presented some abnormal appearances. Nearly all possessed the sporocarp; some had no lobes, some only one, but the greater number had both. The most numerous and most instructive examples were those which possessed horn-like processes arising from the apices of the inner sides of the lobes; these "horns" varied in length, from a mere point to about one-third the breadth of the fungus; they are probably re-absorbed, as there was no indication of their dehiscence; their function undoubtedly being to afford protection to the growing sporocarp. The examination of the wings of an example immediately after emergence, and of several dissected

* Figured upside down.

from the chrysalids, showed the fungus to be more developed than they were in the first specimen examined, in which the butterfly seems to have matured more rapidly than its parasite.

On page 171 I remarked that the lobes of the *napi* fungus had probably become distorted in drying; this is not an exact explanation, the time the butterfly had been dead having little or nothing to do with the contraction of the lobes, which seems to be characteristic of this and some other forms—the *oleracea* fungus for instance. The contraction of the lobes affords an interesting case of the production of mechanical effects by a slight physical modification (shrinkage) of the parts concerned; the function in this instance being to facilitate the dehiscence of the sporocarp; this follows from the circumstance that the lobes on contracting overlap each other, so that they no longer occupy the same plane, but are deflected somewhat from the central line; thus one lobe presses in one direction on one side, and the other lobe in the opposite direction on the other side, imparting to the central organs a sort of twist, which tends to cause a rupture at the weakest part of the structure, which in the case under consideration is usually at the junction of the stem and peridium, where, as I pointed out (*ante*, p. 230), there is a "hilum." Exceptional examples are met with in which the lobes have contracted before the sporocarp has developed sufficiently to receive the pressure on what may be termed its "equatorial"* region. In these cases the lobes are found pressing the sporocarp down to the bottom of the notch formed by the lobes, where it may be seen firmly clasped in their embrace. Why the very similar fungus of *rapæ* and others do not exhibit the like phenomena is difficult to explain; for some unknown reason it seems that the function performed by the contracting lobes is not required in such species.

No reference has hitherto been made to the sexual organs which must necessarily have existed prior to the development of the fungus. I acknowledge that I have not even sought for these objects, believing that both my optical and manipulative powers would prove insufficient for a successful investigation; but certain structures that are probably of this nature have been described by others. A German biologist, whose name even is unknown to me, has described and figured in a German scientific journal what he calls "mother-cells"; he discovered them between the membranes of the wing. An eminent entomologist, in describing these bodies to us, sketched a rough section of a wing, and then proceeded to represent the "mother-cells." I noticed he gave a spiral twist to his figures. "Are those glands

* This is hardly the right term to use; what it was intended to convey was, that the pressure being applied in opposite directions on either side of an imaginary *vertical* axis caused a partial rotation or "twist" of the central *organs.—J. C. B.*

of some kind?" I asked. "No," was the reply; "their function is unknown, but they are said to communicate with the exterior of the wing." If we turn to the illustrations generally found in books on cryptogamic botany, we will probably find figures representing the conjugation of certain fungi, that bear so close a resemblance to these "mother-cells," that I am tempted to regard the latter as the sexual organs of the fungi found on the wings of certain butterflies. The conjugating cells of Erysiphe and Eurotium are cases in point; but all this is conjectural.

In the last sentence of Prof. Smith's paragraph (Entom. xxix. 314) he remarks, "except for their greater delicacy of structure, these androconia do not differ from the other wing-scales." On a previous occasion (Entom. xxix. 230) I pointed out that certain differences do exist; but if we compare the fungi with admittedly androconial scales as, for instance, those of *Callidryas florella* (Entom. xxix. 302), we shall find that there is not even a trace of similitude between them.

In conclusion, I beg leave to offer my best thanks to Prof. Smith for his courteous remarks.

Explanation of the Figures.

Fig. 1.—Sketch of Mr. Scudder's fig. 42 (pl. 46), representing the "androconia of *Laertias philenor*;" this object is shown upside down; its asymmetry is probably due to pressure.

Fig. 2.—Basal portion (for comparison with the above) of the *Pieris agathina* fungus; *st.* stem; *p.* paraphyses.

Fig. 3.—The *P. agathina* fungus, from which the entire stem has fallen out.

Fig. 4.—Fungus of *P. agathina; pe.* peridium; *p.* paraphyses; *b.* border or coping; *r.* rod-like structures on upper part of peridium; *st.* stem, extending the whole length of the peridium; *sp.* sporocarp; *s.* black spot on the apex.

NOTES ON THE BUTTERFLIES OF SICILY.

By Margaret E. Fountaine.

Having had some idea of spending the summer in Sicily, with a view to collecting butterflies when I heard that I should probably be the first English lepidopterist who had ever visited the island, and also that a certain amount of danger might be incurred thereby from brigands, &c., any hesitation I might previously have had, before making up my mind, was quite at an end; I decided to go.

It was about 4 a.m., and a glorious summer morning, on the 10th of May last, when I first beheld the mountains round

Palermo, through a port-hole of the 'Cristofero Colombo,' and thought, as I looked out, of all the little sleeping insects dispersed over those mountains, as yet innocent of the hand of the spoiler. But as I particularly desired to obtain specimens of the genus *Melanargia*, for which I knew Sicily was most famous, and being aware of their local habits, before commencing to work the neighbourhood I thought I might as well allow my head to save my heels; so, having discovered that Signor Enrico Ragusa, whose writings on the entomology of Sicily I had been reading with much interest during the winter months in England, was no other than the proprietor of the Grand Hôtel des Palmes, I lost no time in repairing thither. His reply to my question as to the best locality for *M. pherusa* was, "You'll have to look sharp; the time to take fresh specimens of the *pherusa* is generally the end of April or quite the beginning of May!" adding, however, that as this was a late season I might find it at the foot of Monte Cuccio, distant about four or five miles from Palermo.

The next day I was there; but it seemed a long walk from Bocco di Falco, and I had begun to despair, more especially as "il tempo faceva un po' brutto!" and the sunshine was becoming more and more dim every minute. At last, when I had ascended a short distance up from the foot of the highest peak of Monte Cuccio, I suddenly saw, blown by the wind, one solitary specimen of the butterfly for which I was on the look-out. There was no mistaking it, and, in spite of the unpropitious foothold on the sloping sides of the mountain, covered with loose stones, I at once gave chase, trembling with excitement, and slipping and falling more than once. But the *pherusa* was fast getting the best of it; flying with the wind, it seemed to have no intention of settling, or of doubling in its rapid flight. My heart sank within me, when, lo! there was another, and yet another! I then found that this wanderer, though itself now quite lost to sight, had guided me to the spot where several of its companions soon fell an easy prey to my net. In spite of the strong wind and the misty sunshine, they were out on the wing, and not at all difficult to take, as they had a great predilection for settling on a kind of dwarf thistle, which grew there in some abundance.

After three days' collecting, between the dates of May 12th and 18th, inclusive, I had succeeded in taking over sixty specimens, nearly all in perfect condition, but out of which only thirteen were females; and six males and one female distinctly belonging to the variety *plesaura*, though several other male specimens approached it very nearly.

I scarcely ever saw this butterfly other than in this one locality, where it was extremely plentiful. And though the walk from Bocco di Falco to San Martino was perhaps more beautiful

than anything I had ever seen, with the hedges on either side of the road for miles far out into the country of garden roses covered with bloom, at the roots of which *Convolvulus major* and sweet pea grew in extravagant luxuriance; and though the meadows were golden with orange marigolds, in this perfect wilderness of flowers butterflies of all kinds were conspicuous by their absence; indeed, I scarcely saw any, except one fine male specimen of *Lycæna cyllarus*, and a few *Euchloë belia* var. *ausonia*, or rather what appeared to me more nearly to approach the var. *simplonia*, being identical with some specimens belonging to that variety I had taken on the Becca di Nonna, near Aosta, about this time last year.

At Morreale I found a stream where *E. cardamines* var. *turritis* was common, but many of the specimens were rather worn. It is supposed to be entirely represented by this variety throughout Sicily, but I must confess my inability to see that it differed very materially from the type.

Before I left Palermo Signor Ragusa kindly gave me some information respecting other Sicilian species, notably those of the genus *Melanargia*. *M. arge*, he stated, did not occur at all in Sicily, but seemed to represent *pherusa* on the mainland, *i. e.*, the mountains in Calabria, occurring about the same time. *M. japygia* and the var. *cleanthe*, he said I would find common in several localities during the months of June and July.

After having paid a hurried visit to Girgenti, to see the ruined temples, the next place in which I found myself was Syracuse; but windy weather made it most unfavourable for collecting.

I have since heard that a local variety of *M. galatea* occurs about five miles from Syracuse, and I am fully persuaded that it was my luck to *see* this butterfly on the wing, at a place called Euryelos (about five miles inland). It was flying over about the most inaccessible ground I have ever yet encountered. I only saw from three to four specimens, always on the wing; moreover, I was not alone that morning, but limited to the time Herr Güterbock was pleased to occupy in looking at some old Grecian remains in the immediate vicinity, and, to make a long story short, I did not succeed in netting one single specimen; thinking also that it was only the typical *galatea*, and,indeed, had I known otherwise, I fear Herr Güterbock would have been obliged to find a more prolonged interest in his Grecian remains.

After five days at Syracuse, I next visited Taormina, where I had some idea of settling for the summer. For, that so beautiful a spot could fail to produce good collecting-ground seemed to me impossible; my experience having ever led me to seek for these insects of light and sunshine in haunts the most beautiful and attractive, from the stern grandeur of the high Alps of Switzerland to the sunny, flowery valleys of the Riviera.

It was now early in June, but every expedition I made was, from an entomological point of view, always more or less a disappointing one. It was too early to attempt to make the ascent of Mount Ætna, as it was still covered with snow, and always enveloped with clouds even on the brightest days. Had I stopped at Catania I might have visited some of the less elevated parts of that wonderful mountain (said to measure ninety miles round the base), but from Taormina it was not very accessible even to do that. So I gave it up.

On the rocks above the station of Giardino-Taormina I found *S. semele* var. *aristæus* freshly emerged and in perfect condition. This insect in Sicily seems to differ slightly from the Corsican form; it is decidedly larger, but the fulvous colouring on the upper side of both wings is rather less broadly suffused. I also found here *H. nostrodamus* and *H. actæon*, the latter quite common; and a few other butterflies of little importance.

But as I only spent one week at Taormina, I should not condemn the locality so much from my own experience, as from the fact, that on one occasion an entomologist (I think a German) had taken a house in the neighbourhood, but found so little of interest in his entomological researches that he gave up his house and went away elsewhere. So I too followed his example, and moved on to Messina, where, through a letter of introduction I had to Signor Polimeni, I became acquainted with two local naturalists, Signor Vitale (a coleopterist) and Signor Eugenio Amenta, both of whom knew the neighbourhood well. And as the latter accompanied me in nearly all my expeditions, I wasted no time here in trying unproductive localities.

At first we nearly always went to Gravitelli, not a mile out of the town, but on the low arbutus-covered hills we generally did some "good business." *M. didyma* var. *meridionalis* was now on the wing, the female of which was very large and handsome, the ground colour of the fore wings being entirely suffused with olive green, and on the hind wings the black markings were often exceedingly broad, in some specimens extending over quite two-thirds of the surface. The male was, perhaps, rather brighter fulvous than the type, with the black markings more scanty. *C. iasius*, which does not occur in the west of the island, was quite common on the arbutus slopes of Gravitelli. There was also a remarkably fine form of *V. polychloros*. M. Bellier, speaking of this species, says:—"La *polychloros* di Sicilia e bellissima!" And in this he said truly. *V. cardui* was very abundant. Signor Amenta stated that on one occasion he had seen a perfect invasion of this insect, blown over from Africa, but they did not remain in the district, and in two days had all passed over and gone elsewhere.

But I was still anxious above all things to obtain the remaining species of *Melanargia*, and having heard that M. arge had been

seen and taken in this neighbourhood, imagined that it was just possible Signor Ragusa (who had admitted that he knew little or nothing of the Messina district) might have been mistaken in his assertion that it only occurred on the mainland, especially as the Straits are so narrow that it seemed more than probable that it might also inhabit the immediate neighbourhood of Messina; but as I never received an altogether satisfactory account of its capture, or saw one of the specimens said to have been taken, I am inclined to think that Signor Ragusa's statement was quite correct. In fact, almost the only *Melanargia* I saw here was *M. galatea*, a very large and dark form, some specimens decidedly belonging to the var. *procida*, while most of them nearly approached it. I believe in some seasons *M. japygia* and the var. *cleanthe* would occur here; but this was a bad one, and all I succeeded in getting of this butterfly was one specimen of the var. *cleanthe*, taken by Signor Amenta at Gravitelli, and another (much damaged), on the summit of Monte Ciccia.

The latter locality, about two hours' walk from Messina, was well worth several visits; on the south-eastern slopes of the mountain, where the orange marigolds grew to a great height, and in some profusion, beneath the meagre shade of a forest of umbrella pine trees, *A. pandora* were literally tumbling over each other, so plentifully was that glorious butterfly represented, male and female alike common, and all fresh out towards the end of June. It was here too that we found *A. niobe*, var. *eris*, hitherto not included amongst the butterflies of Sicily; it was a fine form, and the specimens differed slightly from those of Switzerland, the under side of the hind wing in the male being more suffused with green, and the broad submarginal band on the same wing in the female being so dark, that in many specimens the markings were almost black, and always very broad and distinct. *S. semele* var. *aristæus* was very common on Monte Ciccia; also *C. edusa*, the var. *helice* occurring not unfrequently with the type; we took several specimens of it, and I had also caught one at Syracuse; possibly the absence of *C. hyale* from the island, thereby enabling one to know that every light-coloured *Colias* must necessarily belong to this variety, had something to do with it. There was also in Sicily another slight variety of *C. edusa*, described by Signor Ragusa, and called var. *minor* on account of its exceedingly diminutive size; I took one male specimen (measuring only 1·25) during a few days I spent again at Palermo in June. The weather was windy, and I was again disappointed in my hope to find *M. japygia*; indeed I took little of any importance, except, perhaps, some very fine specimens of *C. pamphilus*, var. *lyllus*; and I was glad to return to Messina, as, so far as my superficial experience goes, I certainly consider that district to be the most productive of any I have visited in Sicily. I much regretted not being able to explore the Madonie

mountains, where, doubtless, I would have found many other species, though no *erebia* has as yet been seen in Sicily; but as I heard the hotel accommodation was exceedingly bad, or more likely none at all, and as I was alone, I fear I was not sufficiently enterprising to attempt it, more especially as I heard it was not improbable that in a year or two there might be a good mountain hotel at Castelbuono. And now it but remains for me to add, that throughout the two months I spent in Sicily I met with nothing but courtesy and hospitality from all the inhabitants of the island, rich and poor alike; and those who fear to visit a country so exceedingly interesting and intensely beautiful may take my word for it that "il n'y a pas de quoi!"

All the butterflies observed by me in Sicily were:—

P. podalirius, L. Fairly common everywhere; the ground colour on all the wings in most specimens paler and more washed out, The var. *zancleus*, Z., in which the body in both sexes is white, does not appear till August, so that I did not see it, except in Signor Ragusa's collection.—*P. machaon*, L. Generally distributed, but rather less common than the preceding. It is said that the *machaon* of Sicily belongs exclusively to the ab. *sphyrus*, Hüb., but I did not see more thun a specimen here and there that seemed to me to differ in colour from the typical continental form.

A. cratægi, L. Fairly common round Palermo in June.

P. brassicæ, L. Common everywhere.—*P. rapæ*, L. An exceedingly diminutive form of this species occurs in Sicily, with the type; I took a male specimen at Taormina in June measuring only 1·21.—*P. daplidice*. Common everywhere. I took a female specimen at Taormina with an exceedingly diminutive pink mark next the outer margin of hind wings, appearing on either side, but more distinct above.

E. belia var. *ausonia*, Hüb. Common at Palermo, Syracuse, &c., in May; some of the specimens were very small, and some seemed to me more like *simplonia*, Frr. than *ausonia*.—*E. cardamines* var. *turritis*, O. At Palermo, in the middle of May, rather worn; very much so, later, at Taormina and Messina.

C. edusa, F. Common everywhere.—Var. *minor* (Ragusa). An exceedingly diminutive form, rather paler than the type, seemed common on Monte Pellegrino, near Palermo, in May. I took a male specimen measuring 1·25, at San Martino, in June. Of the var. *helice*, Hüb., one specimen at Syracuse in May; several near Messina in Juue.

G. rhamni, L. Fairly distributed.—*G. cleopatra*, L. Common at Taormina in June, but I only remember once seeing one at Messina; all the rest belonged to the preceding species, which at Taormina I did not observe at all.

T. acaciæ, F. Fairly common at Gravitelli, near Messina, in June.

P. phlæas var. *eleus*, F. Examples of the second brood seemed generally to belong to this variety, but in the spring I could not find any that were not typical.

L. bætica, L. Two specimens, male and female, taken near

Messina in June.—*L. telicanus*, Lang. Seen rarely, near Messina, in June.—*L. baton*, Berg. A few damaged specimens at Messina in June and July.—*L. astrarche*, Bgst. Common.—*L. icarus*, Rott. Very common in every locality.—*L. bellargus*, Rott. Not at all common.—*L. argiolus*, L. I saw a good many specimens of this butterfly, all females, near Messina, in June and July.—*L. semiargus*, Rott. One male example at Zafferia, near Messina, in June.—*L. cyllarus*, Rott. One male on the road to San Martino in May.

Libythea celtis, L. One very damaged specimen seen at Taormina in June.

C. jasius, L. Common at Gravitelli, near Messina, in June.

L. camilla, S.V. Not unfrequent in the neighbourhood of Messina in June and July.

V. egea, Cr. At Messina in June.—*V. c-album*, L. At Taormina and Messina, in June.—*V. polychloros*, L. A remarkably fine form near Messina in June.—*V. urticæ* var. *ichnusa* (?), Bon. Said to have been taken in the Madonie Mountains; all the specimens I saw were typical, and in no way resembling the *ichnusa* of Corsica.—*V. atalanta*, L. Common throughout the summer months.—*V. cardui*, L. Very abundant round Messina in June and July. Some of the examples were very small and washed out; others especially large and deeply coloured.

M. cinxia, L. Not very common. I took one very dark female specimen at Taormina, the rest I had observed being identical with those of North Italy, &c.—*M. didyma* var. *meridionalis*, Stgr. This butterfly is entirely represented by this variety throughout Sicily. I took several specimens at Messina in June and July.—*M. athalia*, Rott. Fairly common near Messina in June and July.

A. latonia, L. Occurring somewhat sparingly in various localities. —*A. niobe* var. *eris*, Meig. Very common on Monte Ciccia in June and beginning of July.—*A. pandora*, S.V. Exceedingly abundant on Monte Ciccia in June and July.

M. galatea, L. A very large, dark form, some of which were of the var. *procida*, Hbst., occurred at Messina in June; specimens taken near Palermo in the same month were much lighter.—*M. japygia* var. *cleanthe*, B. Two male specimens near Messina; one taken at Gravitelli, and one (damaged) on the summit of Monte Ciccia; both in June.—*M. pherusa*, B. Very common on one special spot at the foot of Monte Cuccio, near Palermo, in May. One worn female taken at San Martino in June; the var. *plesaura*, Bell, occurring with the type, but not more than about one in ten.

S. circe, F. Occasionally seen on the wing on Monte Ciccia.—*S. semele* var. *aristæus*, Bon. Exceedingly abundant in rocky, stony places in June and July.—*S. statilinus* var. *allionia*, F. I took one fresh male specimen at Cirpi, near Messina, in July. Signor Amenta said that a week or two later this butterfly would appear in great abundance in this and other localities.

P. megæra, L. I saw many typical specimens of this butterfly, but none seemed at all to approach the var. *tigelius* of Corsica.—*P. egeria*, L. Fairly distributed.

E. ianira var. *hispulla*, Hüb. Common everywhere. Signor Amenta took a male specimen on Monte Ciccia on which the right

lower wing was very much diffused with white; several of the specimens in that locality, though fresh out, were rather pale and washed out, especially on the under side of hind wings.—*E. ida*, Esp. At Taormina, Messina, and Palermo, in June.

C. pamphilus var. *lyllus*, Boisd. This variety occurs in the summer brood. I found it between Bocco di Falco and La Rocca, near Palermo, in June; though after 5 p.m., and a stormy evening, with the sirocco blowing, it was still on the wing and in perfect condition.

S. alceæ, Esq. I took two male specimens at Syracuse in May, and had observed it also at Palermo.—*S. altheæ*, Hüb. I took one male specimen at Palermo in May, and observed others.

H. thaumas, Hufn. One male specimen at Taormina in June.—*H. actæon*, Esp. Common at Taormina, Messina, and Palermo in June; female rare.—*H. nostrodamus*, F. Not very common at Taormina and Messina in June.

Bath, November, 1896.

THE SENSES OF INSECTS.

By G. W. Smith.

May I express some of my views on this subject in connection with the interesting papers of Mr. Arkle and others that have appeared from time to time in the 'Entomologist'?

It has struck me in the first place that if Mr. Arkle had discovered organs of hearing in insects he would have achieved a great anatomical success; but since he has not done so, I do not think we should accept his failure as a proof of their non-existence, granted even that his search has been exhaustive. The anatomical search has been made thoroughly for actual organs of hearing, and naturally or unnaturally enough the search has not been successful. But this does not lessen the importance of a large body of facts which have been adduced from quite a different point of view.

Romanes justly remarks,* that we have no actual (anatomical here) evidence of objective intelligence in the world; but his next statement is as just, namely, that we may presume the presence of that quality in an organism that responds to a certain stimulus in an original and uninstinctive manner.

And to take a different case: when a dog growls, in most cases it is not rash to presume that the dog is angry; and when a cat purrs, we may safely deduce that the cat is pleased, although the terms are comparative.

The facts that are to be collected, therefore, with regard to the senses of insects, must take this form rather than the form of evidence obtained from the dissecting table. Now the facts to which I refer have been conveniently compiled in the second

* 'Introduction to Animal Intelligence' (Science Series).

part of Darwin's book on the 'Descent of Man' (pp. 280–300, 2nd edit., 1894).

There is no need to accept the hypothesis of sexual selection for our purpose, since the observations of several naturalists, including Dr. Hartman, Fritz Müller, Dr. Scudder, Mr. Bates, and Mr. Marshall (Entom. xxix. 42), coincide to prove that the females of certain insects, notably the Cicadas, are actually brought together by the stridulations of the males.

Of course it would be more conclusive if we could actually find these organs of hearing that must be present to the females; but the failure of anatomy in this direction is not sufficiently important to obliterate any just conclusions we have previously gained from the deductive point of view.

With relation to the stridulating organs of insects a word may not be out of place. Among the Diptera, the Reduvidæ, the Homoptera, the Orthoptera, with the Locustidæ, and certain Coleoptera, possess this power of stridulating; and it is a noteworthy fact that these organs must have been exclusively modified to their present pitch of perfection by natural selection for the sole purpose of stridulation; (though in this last statement Mr. Arkle can use my own arguments with some effect against me).

Mr. Arkle, no doubt, justly complains of the senses of touch and hearing being confounded, but this hardly influences the subject from a general point of view. Sir John Lubbock points out that several supposititious, animal instincts and senses would imply no meaning to us at all, since their parallels are not experienced subjectively; but in our present state of knowledge it will be less awkward to employ the term "hearing" where "sound" is concerned.

College, Winchester, Dec. 4th, 1896.

DESCRIPTIVE NOTES ON TWO COCCIDÆ.

By T. D. A. Cockerell.

(1.) Lecaniodiaspis celtidis, Ckll., Psyche Suppt. p. 19.

At the place cited are only a few lines of preliminary description; the full details are herewith given for the first time.

♀. Length 3, breadth 2½, height 1½ mm., broad-oval, convex, above very light ochreous, conspicuously frosted with white secretion. Under side pale orange-yellow; forming a complete ventral scale, but of thin papery texture. Contents of body dark crimson. Eggs pale pink. Antennæ pale brown, 8-jointed; joints 3, 4, and 5 longest and subequal, 4 a little the longer and about as broad as long; 6 a little shorter than 5, and about as broad as long; 7 shorter than 6; 8 shortest, with several hairs; 2 much broader than long, equal in

length to 7; 1 very broad, about as long as 6. Formula 4 (35) (61) (72) 8. Total length of antennæ about the same as width of mouth-parts. Mouth-parts brownish, large and well developed. Derm colourless after boiling, thickly beset with double glands and rod-like structures. Anal area with a brown chitinous armature, consisting of an upper portion shaped like a slug's jaw, and a broad transversely elongate lower portion, with apparently a large central aperture, but really consisting of two large lateral plates, connected by a strong isthmus. Anal ring moniliform, with several hairs.

On *Celtis occidentalis*, San Antonio, Texas, Nov. 27th, 1895 (C. H. T. Townsend). Recently, Prof. E. E. Bogue has found a *Lecaniodiaspis* in Oklahoma, which is like the above, but a little larger. I have not yet made a detailed study of it, but have no doubt it is the same species.

(2.) PULVINARIA INNUMERABILIS, Rathv., variety?

♀. Dark brown, when boiled and flattened under cover-glass, 6½ mm. long, 5½ broad. Antennæ long, slender, pale brown, joint 3 longest; 2, 4, and 5 subequal in length, 8 a little shorter; 6 and 7 equal and shortest. Formula 3 (245) 81 (67). 2 and 5 each with two hairs near the end. There is quite a constriction at the suture between 7 and 8. Legs pale brown, slender; coxa large, trochanter with a long hair, femur about as long as tibia, tarsus about half as long as tibia. Digitules of claw fairly stout, with large knobs, that of one round, of the other oval; both extend considerably beyond tip of claw. Tarsal digitules unequal, one not much longer than those of claw, with the terminal half bulbous, the other longer and slender, with an obliquely placed knob. Derm with large round and oval gland pits. Stigmatal spines in threes, one very long, two short. Margin with small simple sharp spines, in two rows, not near to each other.

The above description relates to the *Pulvinaria* which Prof. C. V. Piper finds "so common a pest in Western Washington [State];" found on currant, hawthorn, plum, pear, mountain ash, willow, poplar, gooseberry, and alder. Prof. Piper remarks: "Of one thing I am certain; it is not native to Western Washington." Formerly Prof. Piper referred it to *P. innumerabilis*, but was criticised for so doing, more especially as its food-habits seem different from those of that species. The question was raised, whether it might be the European *P. ribesiæ*, introduced; but that is a much smaller insect. On the whole, it must be confessed that it is at any rate not very different from *P. innumerabilis;* and since we have no adequate information about the variation of that insect, it seems premature to separate the Washington species as distinct. I will suggest, therefore, that provisionally we call Prof. Piper's insect, above described, *P. innumerabilis* var. *occidentalis*. The ovisac resembles that of *innumerabilis*.

While writing on Coccidæ, I may as well put the following items on record :—

Kermes gillettei, Ckll. I found this last year on oak at Monument Rock, Santa Fé Cañon, New Mexico, 8000 ft. altitude. New to New Mexico, and the highest record for any *Kermes*.

Lecanium (*Bernardia*) sp. On fruit of *Cereus triangularis*, Jamaica (W. Harris). Mentioned on account of the unusual food-plant. The specimen arrived in fragments, and could not be determined.

Aspidiotus ficus, Ashm. Many on both sides of leaves of *Cœlogyne cristata* in greenhouse at Ottawa, Canada. Sent by Mr. J. Fletcher.

A. coloratus, Ckll. Described as a variety of *A. uvæ*, but doubtless a distinct species. I found it lately in abundance at Rincon, New Mexico, on *Chilopsis*. At Las Cruces I noted, on a badly-infested *Chilopsis*, numbers of predatory coccinellids of the genus *Chilocorus*; these Mr. Wickham, to whom I sent specimens, identified as *C. cacti* and *C. bivulnerus*. The *Chilopsis* in question was the one that yielded the original types of *A. coloratus*.

Icerya rileyi, Ckll. Hitherto this has only been known from Las Cruces. On July 10th I found it on mesquite at Colorado, New Mexico. Colorado is the name of a small village, and has nothing to do with the State of that name.

Mesilla, New Mexico, U.S.A., Aug. 29th, 1896.

NOTES AND OBSERVATIONS.

High-Flat Setting.—The numerous writings and opinions of correspondents in late numbers of the 'Entomologist' on the most important question, "Are we to adopt the continental mode of setting?" must have intensely interested and aroused all whose feelings are at all keen on this subject. Surely there is no need to go to this the farthest of far extremes? I indeed hope not. Looking at Mr. Dannatt's note (Entom. xxix. 330), I am of one mind with his remark that perfectly flat-set insects have the effect of producing an objectionably wooden appearance, and thus become ungainly and stiff to most eyes, excluding, of course, continental collectors, who are prone to think otherwise. I cannot, however, agree with another remark of Mr. Dannatt's—that flat setting is contrary to the laws of nature; indeed, I am inclined to consider our own setting more averse to these laws, seeing that the costa of most, and I fancy of all, Lepidoptera is constituted in a rigidly straight plane, in the living state. On our rounded boards the costa becomes curved in accordance with the curvature of the setting board, which produces an utterly unnatural attitude. In fact, many held that the much-rounded insect is as objectionable, or more so, than the flat-set one. Being one of those who wish to bring the wings of

their specimens more level, I have always found that by setting the insect on a board one or two sizes above that of its own, an entirely satisfactory and inoffensive elevation is attained without going to the extreme of using the foreign board. I can only conclude these simple suggestions with the sincere hope that unadulterated continental setting may never come to be *à la mode* in England.—C. J. Nash; Pitnacree, Culver Road, Reading, Dec. 9th, 1896.

Entomologist *v.* Collector.—It will probably be considered by the editor, and by the unhappy "collector," if by no one else, to be about time that this discussion ceased. As I initiated it, and seem to have been elevated into a kind of champion of the class, I may, perhaps, be allowed a few words before the matter drops. It does not seem to me that anything of much value has been elicited, beyond the courteous and considerate tone which, with one exception, has marked the correspondence; but still one point appears to come out pretty clearly, namely, that collectors themselves may be divided into two classes, or, as the anti-collector would probably put it, that beyond the lowest depths there is a lower depth still. In the first class would be placed those who, while not trying to obtain scientific rank, yet do, through their collecting, gain some knowledge of general principles. In the second class would come those, probably not many, who regard their collection simply as an aggregation of specimens, and have no intention beyond the desire of making it as complete as possible. Well, no doubt the whole question was more a matter of sentiment than of practical significance from the first, but still there is satisfaction in knowing how one stands, and so I submit that the position may be exhibited in a tabular form thus:—

I.—Entomologist	Studies scientifically from the outset.
II.—Sub-Entomologist	Collection his first object, but gains some scientific knowledge in the process.
III.—Collector	Has no object beyond amassing specimens.

Now I maintain that all these classes are interdependent, and form parts of one great whole, and that no one of them has the right to express or feel contempt for the others, but that all may and should work harmoniously together.—Rev. W. Claxton; Sunnyside, Woolston, Southampton.

[This discussion is now closed.—Ed.]

The Geographical Varieties of Parnassius apollo.—Mr. Elwes (Entom. xxix. 356) does not coincide with my suggestion that the geographical varieties of the above-named species are worthy of distinctive cognomens. At the same time he does not furnish any clear argument in support of his objection. Although I consider paltry aberrations—such, for instance, as the slightly deviating form of *Lycæna icarus*, known as *icarinus* unworthy of a special name, well marked geographical varieties (such as those I have defined of *P. apollo*), as well as seasonally dimorphic forms, are surely of sufficiently elevated rank. If they were mammals, they would, indeed, according to the modern tendency of zoologists, most likely be made to rank as species. Witness, for instance, the recent re-classification of the North American *Ursidæ* (cf. 'American Naturalist,' 1896). Mr. Elwes's

ideas are, as is well known, in the opposite direction; and I should be glad if he would state his views on the subject, as to what degrees of variation, in his opinion, are worthy of the dignity of distinct names, and which are not. In my humble opinion the geographical varieties of *P. apollo*, which I have described, are of more importance in their relation to the type than the forms of many other species of European Rhopalocera I could name which have already received distinctive recognition. Until I can be convinced to the contrary I shall continue to pursue the orthodox course.—W. Harcourt-Bath, Birmingham, Dec. 8th, 1896.

The Synonymy of Polygonia c-album var. hutchinsoni. — As a great deal of controversy has been going on regarding the var. *hutchinsoni* of *P. c-album*, it may be useful to see the synonymy. Robson ('Young Naturalist,' ii. p. 110) gives the name *hutchinsoni* to the pale form occurring in the summer brood. Harcourt-Bath ('Entomologist,' xxix., 1866, p. 257) proposes the name *lutescens* for the same form, and states that it is the typical form of the continental first brood, but only occurs as an occasional aberration in this country. Tutt ('British Butterflies,' p. 344, 1896) says that there are two distinct forms in the ground colour, one decidedly with more orange in the red. . . . . The paler form appears to be common in the summer brood (June and July), although it occurs in the autumnal one. This he calls ab. *pallida*. The synonymy would therefore read—

Polygonia, Hb.
c-album, Linn.
var. *hutchinsonii*, Robson, Young Nat., ii. p. 110.
= *lutescens*, H. Bath., Entom., 1896, xxix. p. 257.
= *pallida*, ab., Tutt, Brit. Butt., 1896, p. 344.

I hope in a succeeding paper to correct other synonyms, which recent authors have disregarded, owing to the fact that they have not made themselves thoroughly acquainted with all the previously described varieties and aberrations.—John W. Shipp.

[As the priority of the name *hutchinsoni* for the form in question has been clearly established, there does not appear to be any necessity to further discuss the matter.—Ed.]

Gonepteryx rhamni in Ireland.—The reported successful introduction of *Gonepteryx rhamni* into some locality in the Co. Tipperary by Mr. Purefoy is extremely interesting (Entom. xxix. 363). Colonel Cooper, of Markree Castle, Co. Sligo, contemplated, some years ago, a similar experiment, and was planting buckthorn for that purpose, but I am not aware whether he has carried out his intention. It seems, however, passing strange that Mr. Purefoy should have proceeded so recklessly as not to ascertain whether either the food-plant or the insect was indigenous, as he might know the serious injury that might be done to science by tampering with the distributional conditions of our fauna recklessly. His publication of the fact, however, will prevent Tipperary being accidentally included as one of the natural habitats of *G. rhamni*. It is to be hoped that he will further complete his notification by distinctly indicating the locality of this colonisation. It is astonishing to hear that he has not been able to learn whether

any species of *Rhamnus* is native in Ireland, while it is abundantly and widely spread over the adjoining territories of Galway and Connemara, together with the butterfly in question, and reaches southward through Clare to Kerry, northward to Longford and Cavan, where I saw a fine tree of *R. catharticus* myself this summer on the shore of L. Oughter. A reference to 'Cybele Hibernica,' which I have not at hand to refer to, will reveal, doubtless, a wider distribution. But it is more bewildering to read his supercilious treatment of the records of competent authorities as to the existence of *G. rhamni* in Ireland! "It has been reported from Killarney, but it is more than doubtful"! I trust he will not consider it as impertinent if I say that unless he accompanied his MS. with specimens of the butterflies he has introduced, I do not think his *ipse dixit* will carry more conviction than the records of the veteran entomologist Birchall, and myself; or than the testimony of the Hon. Miss Lawless, Mr. Ussher of Cappagh, Mr. Neale (the Secretary of the Limerick Naturalists' Field Club), or others who have published their captures from time to time, and have reported its abundance in the neighbouring county of Galway, and its existence in several others, which records were embodied in my notice of the insect in the Catalogue of Irish Lepidoptera (Entom. xxvi. 120). —W. F. de V. Kane; Drumreaske House, Monaghan.

Mr. E. D. Purefoy is not accurate in stating that *Gonepteryx rhamni* does not occur in Ireland; nor is he right in saying that neither kind of buckthorn grew in this country. If he will turn to the 'Cybele Hibernica,' he will find that *Rhamnus catharticus* is found in seven out of the twelve botanical divisions of Ireland, and *R. frangula* in five of those divisions; and if he refers to Entom. xxvi. 120, he will find Mr. Kane's report of the butterfly's occurrence in Kerry, various parts of Galway, and in Longford. Last year Miss Bewley took it in the Queen's County ('Irish Naturalist,' vol. viii. p. 87), but possibly her specimens may have strayed from Mr. Purefoy's domains. Mr. Purefoy is, however, to be congratulated on his very successful attempt to establish this pretty insect among us; for, though not altogether a stranger, its appearances have been too few and far between.—George E. Hart; 14, Lower Pembroke Street, Dublin, Dec. 5th, 1896.

Is Thalpochares (Micra) Paula, Hübn., a British Species?—In the recent sale of Mr. Briggs' collection was a specimen named as above. It is certainly very different to any foreign specimens of *T. paula* which I have seen. It far more resembles foreign specimens of *T. parva*, the sexes of which are by no means alike. In the sale catalogue reference was made to the Ent. Mo. Mag., vol. ix. p. 19, where, in the description of *T. paula*, the second fascia is stated to be a mere brown line, once angulated, and before it is a crescent-shaped upright white streak on the inner margin, occasionally becoming a fascia, and reaching the costa. "*Micra*" *parva* is stated to have both the fasciæ straight and oblique. Now, as I understand from Meyrick's Handbook, it is *T. paula* which has both the fasciæ straight and oblique, and *T. parva* which has the second fascia crooked. The larva, too, of *T. paula* feeds on *Gnaphalium arenarium*, which is not a British plant. As it is more than twenty years since Mr. Barrett wrote the

article in the E. M. M., perhaps he will kindly give us his opinion afresh.—C. W. Dale; Glanvilles Wootton, Dec. 4th, 1896.

Committee of the Entomological Society of London for the Protection of Lepidoptera.—At a meeting held on November 25th, it was resolved to invite the co-operation of local Societies throughout the United Kingdom, and to ask them to furnish information as to proceedings likely to cause the extermination of local species of Lepidoptera. Communications will be received by the Hon. Secretary, Chas. G. Barrett, 39, Linden Grove, Nunhead.

CAPTURES AND FIELD REPORTS.

Acherontia atropos in 1896.—I took a fine larva of *A. atropos* last August in New Barnet, ten miles from London.—H. C. Regnart; Clinthill, Park Road, New Barnet.

Variety of Vanessa atalanta.—The variety of *V. atalanta*, referred to Entom. xxix. 371, appears to be similar to the aberration of the species recorded by me, Entom. xxiv. 31.—J. Hy. Fowler; Poulner, Ringwood, Dec. 5th, 1896.

Anosia menippe, Hübn. (D. erippus, Cr.)—After seeing the note, *ante*, p. 365, it seemed only right that I should report the following:—On July 12th last, at Newland's Corner, Surrey, a young friend who was out with me collecting saw at rest on the trunk of an oak a well-marked specimen of *Anosia menippe*, Hübn. In his haste to make a capture he made a mis-stroke, and the insect escaped. As he knew the insect, and there is no doubt as to his *bona fides*, it seems that Surrey may fairly be credited with having been favoured last summer with the presence of a specimen of this grand butterfly.—W. J. Lucas; Knight's Park, Kingston-on-Thames.

Hybernia aurantiaria and defoliaria in mid-London.—On Nov. 20th last at mid-day I captured a specimen of *Hybernia aurantiaria* in good condition at rest outside a ground-floor window on the street in Chancery Lane. The next day, Nov. 21st, on the flag-stones between the gates of the British Museum and the building itself I found a specimen of *H. defoliaria*. It had been trodden upon by some passer-by, but the upper wings were sufficiently perfect to show that the insect had been in good condition.—Selwyn Image; 6, Southampton Street, Bloomsbury, W.C.

Further Notes on Callimorpha hera.—To my remarks on this species in the 'Entomologist' for 1895 (vol. xxviii. p. 290), I should like to add the following:—Seventy-seven out of some hundred and twelve larvæ of *C. hera* successfully hybernated on ground ivy, and fed up rapidly on white dead-nettle; three were lost by drowning (these I had preserved); whilst some two or three specimens died when full-fed. Most of the rest spun a slight cocoon between the moss at the top of the pot and the soil, none pupating underground. Six or seven spun together two or three leaves of the nettle, and then turned into the chrysalis state. I reared in all forty-nine beautiful specimens and nine cripples, the latter I believe caused by my having kept the pupæ too dry. Most of the imagines emerged between 2 and 4 p.m. indoors. The first emerged on June 30th,

and the last July 19th. Of the forty-nine specimens reared, twenty-six were males and twenty-three females: nineteen males and seven females had red hind wings; seven males and ten females had orange hind wings; and six females had yellow hind wings, Let me strongly advise those who have larvæ this year not to feed them on dandelion or groundsel.—WILLIAM HEWETT; Howard Street, York.

NOTES ON THE MACRO-LEPIDOPTERA OF THE CONWAY VALLEY, NORTH WALES.—The cliff-like line of hills which form the boundary of the Vale of Conway on the west side is broken at intervals by various valleys and glens, down which rush the tributary rivers and streams from the lakes and pools of Eastern Snowdonia. In most of these insect life seems more abundant than in the wider strath of Conway itself, which I attribute to their freedom from the floods which occasionally submerge the low-lying Conway vale; and as I was living at the bottom of one of the most picturesque of these little valleys the greater part of last spring and summer in order to fish the Conway, and the Cwlyd and Crafnaat lakes, I made the following notes on some of the Lepidoptera that I met with during walks and hours not devoted to angling. The glen in question, though only about two miles in length from where the stream rises out of one of the larger lakes to where it rushes down by a series of cascades into the Conway, presents a diversity of physical features, as the water runs from a mountainous and moorland region at the top of the valley through thickly-wooded dells of fir, oak, birch, and alder, into the meadow-land at the bottom; and this would naturally be favourable to a variety of lepidopterous insects, as the altitude varies also from 600 feet at the lake, with the hills on either side rising to 1000 feet, to nearly sea-level at the tidal reach where the stream joins the Conway. Among the Rhopalocera I found *Pieris rapæ* and *P. napi* both abundant; but I did not observe many *P. brassicæ* until late in the season, when they became very numerous. On July 31st a small meadow of uncut grass and wild flowers was full of them, mostly at rest on the flowers.—*Euchloë cardamines* was abundant.—*Argynnis euphrosyne* more or less common all over the central and woody portion of the glen; but as long as they were "out" they were always collected in vast numbers in a little glade covered with small furze and alder bushes, where I could obtain any quantity without moving from one spot; here on May 8th they literally swarmed.—*A. selene*, common, but nothing like the numbers of the preceding species.—*Vanessa io*, hybernated specimens very plentiful in the spring, and most of them in excellent preservation. I did not see many of them in the autumn; but the continuous rainfall would account for that, as it did for the scarcity of *V. atalanta*, of which I only saw two.—*V. urticæ*, common. —*V. c-album*, plentiful, especially hybernated specimens; but I took five splendid ones in two adjoining meadows on Sunday, August 2nd. The rich velvety gloss of the black spots on the wings seem to fade soon after death. —*Pararge egeria*, common everywhere in the valley during the latter part of the season, but the earlier broods were very local; for weeks I only found them in one spot.—*P. megæra* swarmed everywhere; it was without doubt the commonest butterfly in the valley.—*Epinephele ianira*, common; *E. tithonus*, *E. hyperanthus*. I took a few specimens of each.—*Cœnonympha pamphilus*, *Polyommatus phlœas*, *Lycæna icarus*, all abundant.—*Thecla rubi*, common on the moors at the top of the glen.—*L. argiolus*, one or two.—*Nisoniades tages* and *Hesperia sylvanus*, both very common. Heterocera.—*Smerinthus populi*, found four: one on a path, May 5th;

two in copulâ on June 5th; and one on June 11th.—*Zygæna filipendulæ*, abundant.—*Spilosoma mendica*, *S. lubricipeda*, *S. menthastri*, common.—*Hepialus humuli*, abundant in the meadows; the fishermen in these parts call it the night-moth.—*Nemeophila russula*, abundant in one spot, where I obtained over a dozen specimens on two successive afternoons; I never saw one elsewhere.—*Arctia caia*, several.—*Porthesia auriflua* and *P. chrysorrhœa*, took specimens of both.—*Dasychira pudibunda*, found one larva—*Bombyx quercus*, *B. rubi*, and *Odonestis potatoria*, all abundant: as well as *Saturnia carpini* on the moorlands.—*Phalera bucephala*, abundant.—I found lots of the larvæ of *Diloba caruleocephala*: and was lucky enough to obtain one of *Acronycta alni* exposed on an alder leaf. It has pupated in a piece of old wood, and I hope that it has not been ichneumoned. Among other Noctuæ I obtained *Acronycta psi*, *Hadena monoglypha*, *Mania maura*, *Hydræcia nictitans*, *Xylocampa lithorhiza*, *Agrotis exclamationis*, *Phlogophora meticulosa*, *Cucullia umbratica*; and lots of the common Geometræ, such as *Bumia luteolata*, *Pericallia syringaria*, *Crocallis elinguaria*, *Amphidasys betularia*, *Bupalus piniarius*, as well as *Tephrosia biundularia* and *B. crepuscularia*.—Francis Davison Bland; Trefin, North Wales, November 22nd, 1896.

SOCIETIES.

Entomological Society of London.—*November 18th*, 1896.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. Malcolm Burr, of "Bellagio," East Grinstead, Sussex; Mr. G. H. Gale, of the Public Works Department, Hong-Kong; and Mr. A. E. Wileman, of the British Consular Service, Yokohama, Japan, were elected Fellows of the Society. Mr. Tutt exhibited a series of the ochreous form of *Tephrosia bistortata*, Goetze, known as ab. *abietaria*, Haw., captured by Mr. Mason in March, 1895 and 1896, near Clevedon, Somerset; also a series of the second brood of the same species (ab. *consonaria*, St.), bred from ova laid by the Clevedon specimens. He also exhibited a series of *Tephrosia crepuscularia*, Hb. (*biundularia*, Esp.), taken by Dr. H. Corbett at Doncaster; a peculiar variety of *Hipparchia semele*, captured by Mr. H. S. Clarke near Ramsey, Isle of Man; also a series of *Plusia bractea* bred from ova laid in July last. The eggs and larvæ had been subjected to forcing treatment, with the result that the moths emerged in October. Mr. Tutt also exhibited a very dark specimen of *Polia chi* ab. *olivacea*, captured at Meldon Park, Morpeth, by Mr. Finlay. Dr. Sharp called attention to Mr. Ernest Green's plates of the Coccidæ of Ceylon, which were exhibited on a screen in the room, and said that he was inclined to consider the Coccidæ as a distinct order of insects, but at present the evidence was hardly sufficient to warrant this. He asked Mr. Green if he could give him any information with regard to the development of the wings in the male. Mr. Green said that in the males of the Coccidæ the wings first appeared in the penultimate stage as small projections on the sides of the thorax. These wing-pads grew to a certain extent without any further ecdysis. Though the insect was then quite inactive, and took no food during this stage, the rudimentary wings and legs were free from the body, and were capable of some slight movement. After the

final ecdysis the wings of the imago were fully expanded, and assumed their natural position before the insect left the sac, or puparium, in which the resting stage had been passed. Mr. McLachlan and others continued the discussion. Mr. Bethune-Baker exhibited a yellow spider from Orotava, which was of the exact colour of the flowers that it usually rested upon, and which had been observed to catch Vanessæ which settled on these flowers. Mr. Barrett said he had noticed a spider with the same habit on the ox-eye daisy in Surrey. Mr. Bethune-Baker also exhibited a very curious dark variety of *Arctia caia*, bred by Mr. Moore. Professor Meldola stated that it had been of late found difficult to store bristles in the City owing to the ravages of a moth, of which he exhibited living specimens of the larvæ and pupæ. Mr. Barrett said that the moth was *Tinea biselliella*. Mr. Blandford stated that the bisulphide of carbon treatment might be found to be of advantage if it were practicable, but more would have to be ascertained with regard to the extent and character of the ravages before anything could be determined upon. Mr. Merrifield, Mr. Green, and others took part in the discussion which followed. Mr. Blandford called attention to the use of formalin as a preventive of mould, and said that it would probably be found of use in insect collections; an object once sprayed with this substance never became mouldy afterwards. Professor Meldola said that formalin was another name for a solution of formic aldehyde: it is now much used in the colour industry, and is, therefore, produced on a large scale. Mr. Newstead communicated a paper entitled "New Coccidæ collected by the Rev. A. E. Eaton in Algeria."

December 2nd.—Dr. David Sharp, M.A., F.R.S., Vice-President, in the chair. Dr. Sharp exhibited the series of Longicorn Coleoptera of the genus *Plagithmysus* from the Hawaiian Islands, of which a preliminary account had recently been given by him elsewhere. He said that these examples were the result of Mr. Perkins' work for the Sandwich Island Committee, and afforded a fair sample of his success in the other orders, which would be found to have completely revolutionised our knowledge of the entomological fauna of these islands. He stated that Mr. Meyrick had recently informed him that the Geometridæ would be increased from six species to forty-four, and that the genus *Plagithmysus* showed an almost equal increase; and that the working out of the specimens was very difficult, owing to the variability of the species and to their being closely allied. Mr. Malcolm Burr exhibited a specimen of a cockroach, *Pycnoselus indicus*, Fabr., taken in a house at Bognor, Sussex. He said this was the first record of the occurrence of the species in England. According to De Saussure, it was distributed throughout India, Ceylon, Mexico, and the United States. Mr. P. Crowley exhibited a remarkable variety of *Abraxas grossulariata* taken in a garden at Croydon last summer. Mr. Tutt exhibited some Micro-Lepidoptera from the Dauphiné Alps. Several specimens of *Psecadia pusiella*, Röm., showing considerable difference in the width of the black zigzag band crossing the centre of the fore wings longitudinally. The species was taken at La Grave, in a gully at the back of the village. A large number of specimens were secured, chiefly resting on the trunks and branches of two or three ash and willow trees growing on the bank at the side of

the gully. A few specimens, however, were obtained drying their wings on the grass on the bank, but Mr. Tutt stated that he failed to find pupa-cases. The captures were all made on the mornings of August 7th and 8th. In spite of the striking conspicuousness of the insect when set out for the cabinet, it was by no means easy to detect at first on the tree trunks. Mr. Tutt also exhibited specimens of a "plume" which had been named *Leioptilus* (*Alucita*) *scarodactyla*. It was exceedingly abundant on the *Artemisia* growing on the roadside just below La Grave. There could be little doubt, he thought, from the habits of the insect, that the *Artemisia* had been its food-plant. He also exhibited specimens, from Le Lautaret, of *Sericoris rivulana*, *Gelechia spuriella*, *Sophronia semicostella*, *Pleurota pyropella*, *Œcophora stipella*, and *Butalis fallacella*. The latter were chiefly interesting from the fact that they were taken at an elevation of about 8000 feet. Lord Walsingham made some remarks on the specimens. Lord Walsingham read a paper entitled "Western Equatorial African Micro-Lepidoptera." A discussion ensued, in which Dr. Sharp, Herr Jacoby, and others, took part.—H. Goss, *Hon. Secretary*.

South London Entomological and Natural History Society.—*November 26th*, 1896—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. Barnett, of Royal Hill, Greenwich, was elected a member. The meeting was devoted to a special exhibition of varieties, and was largely attended. Mr. Mansbridge showed series of *Abraxas grossulariata*, including the Leeds smoky forms; of *Polia chi*, including var. *suffusa* and var. *olivacea*, with the beautiful West Riding form; and of *Hibernia aurantiaria*, with many melanic forms. Mr. Oldham, *Brenthis* (*Argynnis*) *euphrosyne*, with few markings on upper wings in contrast to well-marked hind wings; a xanthic *Epinephele ianira*, and putty-coloured and yellow females of *Odonestis potatoria*. Mr. Adkin, the various forms of *Boarmia repandata*, *Camptogramma bilineata* (including black Irish specimens), *B. cinctaria* and *Thera juniperata*, with beautiful specimens of *Cidaria corylata* var. *albocrenata*, *Abraxas grossulariata*, black *Acidalia marginepunctata*, black-banded *Eubolia bipunctaria*, banded *Anaitis plagiata*, and unicolorous *Ematurgia atomaria*. Mr. Mitchell, specimens of *Saturnia pavonia* (*carpini*)—1, dark female; 2, gynandromorphous form bred from Wicken; and an example of *Chrysophanus phlœas* with large and elongate spots nearly forming a band. Mr. Dollman, a series showing the variation of *O. potatoria*; a dwarf *Anthocharis cardamines*; and an example of the same species with the dark tips of the primaries suffused and extending inwards. Mr. Ashdown, a series of *Coccinella hieroglyphica* varying from entirely testaceous, through spotted forms to entirely black, all from Oxshot. Mr. Barrett, series of the following species, from very many localities:—*Melanippe hastata*, *M. tristata*, *M. fluctuata*, *Boarmia repandata* (including some very fine black forms), *Eupithecia togata* (including the very dwarf race), *E. extensaria*, *E. sobrinata*, and *E. stevensata*. Mr. Auld, the first known bred British *Callimorpha hera* var. *lutescens*; series of *Spilosoma lubricipeda*, with its var. *zatima* and var. *fasciata*, together with a number of intermediate forms; a broad-banded *A. plagiata*; and vars. of *Dicycla oo*, *Abraxas urticæ* (without dorsal spots), and *Lomaspilis marginata*. Mr. Levett, vars. of *Callimorpha dominula*, bred from Deal, three of which were of the yellow

form. Mr. Mera, three vars. of *Arctia caia*: 1, with inner half of fore wings almost completely white; 2, with white markings of fore wings only slightly indicated; 3, white almost covering fore wings and black on hind wings much diminished; a *Cidaria silaceata*, pale brown, with paler lines, reminding one of *C. reticulata; Hadena thalassina*, with absence of usual markings and of almost uniform smoky grey; an *Arctia villica* with smoky hind wings, and one with black suffused over all the wings; and a *Brenthis* (*Argynnis*) *euphrosyne* with confluent spots across the centre of both wings. Mr. Turner, the most distinctive forms of *Hibernia leucophæaria*, *Gnophos obscuraria*, and *Oporabia dilutaria;* a *Cœnonympha typhon* with a series of well-developed ocellations and a large white patch on the upper side of the hind wing, from Carlisle; and on behalf of Mr. Wilkenson, of Carlisle, a very variable series of *Melitæa aurinia* (*artemis*), including several good aberations. Mr. H. Moore, Exotic Orthoptera, including: 1, *Locusta peregrina* from several localities, showing great variation in density of colour; 2, *Pachytylus migratorius* var. *cinerascens;* 3, a long series of *Œdipoda fasciata*, from many places, and varying with the soil upon which it rests; and some ten species of American Œdipodidæ. Mr. T. W. Hall, conspicuous varieties of the following species:—*Arctia caia* (one almost black secondaries), *Spilosoma lubricipeda* (one of var. *zatima* taken at Wicken), *Sesia culiciformis* (yellow-banded), *Polia xanthomista* (var. *statices*), *Demas coryli* (banded), *Mamestra persicariæ* (unicolorous black), *Xylina conspicillaris*, and many other species. Mr. Frohawk, a grand series of under sides of *Enodia* (*Epinephele*) *hyperanthus*, varying from extreme var. *arete* to the beautiful var. *lanceolata;* and vars. of *Papilio machaon*, including a very dark tawny form bred from Wicken. Mr. Tutt, specimens of *Melampias melampus* and *M. pharte*, upon which he bases his opinion that they are only forms of one species; and a series of the hitherto supposed distinct *Cœnonympha iphis* and *C. satyrion*. Mr. Dawson, a dark male of *Dryas* (*Argynnis*) *paphia*, somewhat approaching var. *valesina* of the female; Shetland forms of *Camptogramma bilineata;* a var. *schmidtii* of *Chrysophanus phlæas*; and a *Tæniocampa incerta*, with much intensified transverse lines.—Hy. Turner, *Hon. Report Sec.*

Cambridge Entomological and Natural History Society.—*November 13th*, 1896.—The President, Dr. Sharp, in the chair.—Mr. Fleet exhibited a copy of the first number of a work by Thomas Denny, entitled 'Illustrations of Lepidopterous Insects found in the Vicinity of Cambridge'; it contained several coloured plates, and was printed and published at Cambridge, but bore no date; also some specimens of *Zygæna exulans* from Braemar, and *Noctua sobrina* from Rannock. Mr. R. Farren showed some "jumping beans"; the "bean" is the seed of a Mexican euphorbiaceous plant inhabited by a *Tortrix* larva, whose movements cause the seeds to roll about, and even to make short jumps. Mr. Rickard, some British beetles and a common earwig with very long forceps; this latter gave rise to some discussion on the wings and flight of this insect, Dr. Sharp expressing his opinion that it seldom resorts to flight. Also some pupæ of *Orgyia antiqua*.

November 27th.—Dr. Sharp in the chair.—Mr. Jones exhibited a local imago of *Smerinthus tiliæ* with both its wings deformed and correlative variation of marking. Mr. Rickard read a paper dis-

cussing some questions in connection with the formation of lepidopterous pupæ, making reference to the so-called "Poulton's line," and the criticisms of Dr. Chapman and Mr. J. W. Tutt thereanent. He said that the proboscis of the pupa of *Acherontia atropos* is 40 mm. long; that of the imago is but 14 or 15 mm. He suggested that the brevity might be in connection with the habit of extracting honey; and also that the reason why the moth was so rarely found in beehives in this country might be found in the construction of the hives. The object disclosed by the last moult of a lepidopterous larva resembles neither a caterpillar nor a pupa, but is much more like the imago. There is also present a thick coatings of gelatinous-looking material enveloping the entire organism; the external surface of this material rapidly hardens and takes on the special form of the pupa. As the lower portion of it solidifies it shrinks away from the enclosed imago, with the result that the pupal imago is left loose inside the pupal envelope, the only organic connection seeming to be the tracheæ that connect the imaginal with the pupal spiracles. Proof of the accuracy of this statement is afforded by the presence of wing-cases on the pupæ of wingless female moths. Thus the female of the *Orgya antiqua*, for instance, possessed imaginal wings of average size at the last larval moult, such wings being subsequently reabsorbed. The contradictory statements of Prof. Poulton and Mr. Tutt are easily reconciled if we suppose that the Professor's observations were made at an early stage of pupal existence, while Mr. Tutt's were made immediately before emergence of the imago.

Nonpareil Entomological and Natural History Society.—*November 5th*, 1896.—Exhibits: By Mr. J. A. Clarke, a specimen of the rare sawfly (*Sirex juvencus*) captured at Eltham on Oct. 5th. Mr. Huckett said he had no doubt it was an imported species. Mr. Clarke, however, added that he had one given him some years ago by Mr. Eddols, taken on the Hackney marshes. By Mr. Lusby, two species of *Zygæna filipendulæ*, one example showing pretty variation of the hind wings, which were rosy orange in colour and minus the dark margins. He remarked that he had bred some numbers of this species, and that any variation that occurred had always been in the hind wings; this was considered to be merely a curious circumstance, members having bred specimens in which both fore wings were aberrant. Mr. Lusby also showed a very pretty specimen of *Cœnonympha pamphilus*, the inner ground of the wings being paler than usual, with heavily developed dark borders, and minus the spot on tip of fore wings. Likewise two male specimens of *Liparis dispar*, illustrating the darkening by interbreeding. With reference to *L. dispar*, Mr. Norman, who has bred numbers of this species, remarked that the males of the successive broods get darker each year, and the females degenerate; and he was of opinion that if interbreeding was continued, the female would in time become apterous. A discussion on "The Preservation of Species (local and otherwise) from Extermination by Overcollecting, &c.," was fixed for the next meeting (Nov. 19th), and any suggestion will be welcome. Mr. J. A. Clarke drew attention to the extraordinary fecundity of *Lasiocampa quercifolia*, he having obtained 1050 eggs from one female.—F. A. Newbery, *Reporting Secretary.*

THE ENTOMOLOGIST

Vol. XXX.] FEBRUARY, 1897. [No. 405.

VARIETIES OF *ABRAXAS GROSSULARIATA*.

The two specimens of *Abraxas grossulariata* figured above represent the most suffused examples bred by Mr. H. McArthur from about three thousand larvæ collected in the neighbourhood of Fulham last spring, from garden euonymus (*Euonymus japonicus*), and fed up on the same plant. The majority of the imagines were rather undersized, measuring only about $1\frac{1}{2}$ in. in expanse; but some few were fully up to $1\frac{3}{4}$ in. across the wings, and were of the most ordinary forms, with the exception of about thirty specimens. The prevailing form of variation in these was the increase of the dark markings, more particularly of the basal two-thirds of the fore wings; but two examples, although by no means strongly marked, convey the impression of the whole of the wings being in "water-mark," giving the insects a very remarkable appearance.

Robt. Adkin.

Lewisham, January, 1897.

ON NAMING GEOGRAPHICAL VARIETIES.

By H. J. Elwes, F.L.S., F.E.S., &c.

Mr. Harcourt-Bath (*ante*, p. 15) asks me to state my views on this subject, as he thinks that the names he suggested for supposed forms of *Parnassius apollo*, in 'Entomologist,' 1896, p. 331, are "of more importance in their relation to the type than the forms of many other species of European Rhopalocera" he "could name which have already received distinctive recognition." It is quite impossible to lay down any hard and fast rule on this subject. In every case as it arises one must be guided by experience, and especially by the amount and character of the variation which occurs. In some very wide-ranging species, as *Vanessa cardui* or *V. antiopa*, no one has hitherto thought it worth while to separate supposed geographical varieties, though, as shown by Mr. Kirby's recent note (Entom. xxix. p. 318), it might be done by those who wish to multiply such names as much as possible. Other species, such as *Melitæa didyma* and *M. phœbe*, show such comparatively constant local variations in certain districts that it is perfectly possible for anyone having a sufficient knowledge of their variations to say where a very large proportion of the specimens have come from; but, in order to do this, one must have such a collection as, I am sorry to say, is hardly to be found in England at present.

The experience which I have gained during many years of collecting in Europe, Asia, and America, and a personal knowledge of the best collections of Lepidoptera in Europe and the United States, inclines me to think that the larger the series of varieties one examines from many different localities and the greater the knowledge one acquires of them, the more difficult it becomes to define local races accurately. And this applies to birds and plants as much as to Lepidoptera. It is the local collectors who are always most in favour of named local varieties; and though Dr. Staudinger's collection, which perhaps is unequalled for its richness in local varieties by any other collection of natural-history specimens in the world, may be cited in opposition to my opinion, yet I have often found that his personal inclination is against the undue multiplication of varietal names, and that he is as ready as anyone to admit that local races are often impossible of exact definition.

I will now proceed to deal with these particular forms about which I think Mr. Harcourt-Bath is wrong. First of all, there is no reason why he should take "the prevailing form found in the alps" as the type of *P. apollo* because Linnæus described the species, presumably from specimens of his own country, and, if so, the form named by Mr. Harcourt-Bath *scandinavica* would

be the type. I have four males and five females from Sweden and Norway, which are, it is true, larger than the average from the Swiss alps, but do not show the submarginal wavy band of dusky scales in the hind wing in either sex more strongly than many alpine specimens. Thus his only character for defining *scandinavica* falls to the ground. Secondly, as to the variety he calls *pyrenaica*. I have only kept two pairs, which I took at Vernet in the Eastern Pyrenees, and which I am certain no one could pick out from my alpine specimens if I took the labels off; but if a variety occurs in the Pyrenees showing the characters given by Mr. Harcourt-Bath, namely, a lighter colouring of the male and a darker colouring of the female, then it would stand under the name of *hesebolus*, Nordm., from Central and Eastern Siberia, which is defined by Staudinger as follows:—"v. major, ♂ albidior, ♀ obscurior." This definition, however, is not applicable to all the Siberian specimens; and, so far as my own specimens go, is more applicable to those from the Ural than to those from the Altai mountains. Now we come to the variety *siberica*, of which Mr. Harcourt-Bath simply says—"The specimens from Siberia are larger, according to various authorities, but I do not know in what other particulars they differ from the type." Clearly his knowledge of this form, if it is one, is absolutely insufficient to justify him in naming or defining it. Lastly, he says that "all the specimens of *apollo* from the Alps, the Pyrenees, and the Jura, may be divided into two sets according to their tints, in one of which it is of a delicate cream colour, although in the majority of specimens it is white." For the cream-coloured form he would like to suggest the name *pulchella*. Now as he has already suggested the name *pyrenaica* for the Pyrenean insect, and as *pulchella* implies something smaller, this name is clearly inappropriate, even if two forms from the Alps and the Jura could be defined at all. In most of the species of *Parnassius* very freshly-emerged specimens are cream coloured, fading to white when they have flown for a day or two.

Having thus given reasons for my opinion that these particular names cannot be accepted, I would tell Mr. Bath that the forms of *P. apollo* from the Carpathian and Ural mountains and from Spain, which he does not appear to know, and probably many other local varieties which I do not know, show differences as great or greater than those he has mentioned; so that if these names are admitted several others will have to be added; and if this is so in a species like *apollo*, the result of a similar treatment of some much more variable species would be to bring the whole system of scientific nomenclature, already quite difficult enough, to a hopeless state of confusion.

Colesborne, Gloucestershire.

NOTES ON BRITISH ORTHOPTERA.

By Malcolm Burr, F.E.S.

The kindness of Mr. Guermonprez, of Bognor, has recently allowed me to inspect some of the specimens in his collection of British Orthoptera. Some of the localities are new; and the capture of *Pycnoscelus indicus* and *Œdipoda cærulescens* is very interesting. The former bids fair to become cosmopolitan, and, like other cockroaches, will perhaps be some day naturalised in England. Our claim of the latter as a British species is based on the capture of two, many years ago, at Southampton, most probably, as Mr. Dale suggests, imported with vegetables from Jersey, where it is common. There are two now in the British Museum collection, which I believe are the original pair. The following list includes the more interesting species:—

Ectobia livida, Fab. Pupæ. Charlton Forest, in North Sussex, and at Bognor.—*E. lapponica*, L. A male from a wood near Cocking, Sussex; and two, which I have not seen, similar individuals, from Wood Eartham and Dane Wood, in Sussex.

Pycnoscelus indicus, Fab. Two specimens, taken some time ago in a house in Bognor; evidently imported from abroad. This species is indigenous to India and Ceylon, and has spread with trade to the United States and Mexico. I am not aware that it has been taken before in this country. (At p. 21, line 13 from bottom, for *Pycnoselus* read *Pycnoscelus*.)

Stenobothrus elegans, Charp. Pagham Marsh, Sussex.

Gomphocerus maculatus, Thunb. Heyshott and Cocking and Eartham, in Sussex; also Tonbridge Wells.

Œdipoda cærulescens, L. One mutilated specimen. As to data, Mr. Guermonprez says that his recollection of its locality is "decidedly hazy," but he thinks near London. It was taken many years back, probably before 1870.

Tettix bipunctatus, L. Dorking; Hayling Island; Dale Park.

Leptophyes punctatissima, Bosc. Dorking; Blear Wood, near Herne Bay, in November (imago); Bognor, at sugar at night, and on palings.

Meconema varium, Fab. Dale Park; near Bosham; Bognor, at night, on palings and at sugar.

Xiphidium dorsale, Latr. Pagham Marsh.

Locusta viridissima, L. Bognor.

Platycleis brachyptera, L. A male from Broadwater Down, Tonbridge Wells.—*P. roeselii*, Hagenb. A male from a field at Herne Bay; probably the same locality where Mr. Saunders took this rare species (Ent. Mo. Mag. n. s. i. (1890)). One pupa from Par, Cornwall, seems to be referred to this species, the pale border on the lateral lobes of the pronotum showing up distinctly; but this border is more or less visible in the first stages of *P. grisea*, Fab., in which species it is lost before arriving at the nymph stage.

Thamnotrizon cinereus, L. A female was taken at Aldwich, in

North Sussex, in October, laying its eggs in an elm trunk at night, with the ovipositor firmly fixed into the trunk.

Gryllotalpa vulgaris, Latr. By Chichester canal.

Bellagio, East Grinstead.

DRAGONFLIES IN 1896.

By W. J. Lucas, B.A., F.E.S.

Fig. 1.—*Pyrrhosoma minium*, Harr.

Fig. 2.—*Erythromma najas*, Hans.

Remarkable in many ways has been the season of 1896. After an almost frostless winter in the South of England, the end of April and beginning of May, when dragonflies commence to appear, was cold and ungenial, and the early species were a few days later than usual in coming on the wing. The season, however, as it grew older, improved continually, and must probably be set down as a good one until summer suddenly collapsed in the middle of August. But even after that, on the few scattered fine days that occurred, some species were to be taken, and in good numbers, until the latter end of September.

What, however, constitutes the most striking feature of the season was the long summer drought, and it will be interesting to note during the next three years its effect, especially on those

species which had oviposited early in the year before the drying up of the ponds and smaller streams. Information is unfortunately scanty with regard to such periods of drought, but what little there is seems to point to the fact that they have but slight harmful effect on odonate existence. The eggs probably remain imbedded in the mud, where sufficient moisture remains to keep alive the little speck of protoplasm, and it is not too much to suppose that the nymphs may maintain their existence under the same conditions. In this connection Mr. McLachlan's observation of *Agrion mercuriale*, ovipositing in mud in Savoy in 1884 (Ent. Mo. Mag. 1885, p. 211), and of *Pyrrhosoma minium* doing the same in the New Forest in 1895 (Ent. Mo. Mag. 1895, p. 180), are most useful. My own observation during last autumn of the eggs and freshly hatched larvæ of *Sympetrum vulgatum* tend to shew their hardiness. For, about the 15th of September last a female laid in a collecting-box a large number of eggs (some two or three hundred perhaps), which were elliptical in section, the major axis being about ½ mm. On reaching home I placed them in water, and about a month later the young larvæ commenced hatching out, and others continued to appear for a month or so longer. Though many of them were hatched in a porcelain evaporating dish about four inches in diameter, and could have had practically no food for weeks, their vitality did not seem to be impaired, and few, if any, died. They have now been removed to better quarters, where they may perhaps thrive, in which case some of them, in three years or so, may produce imagines in spite of their early fast; for dragonfly nymphs do not seem to sustain any permanent harm from being kept for weeks without food in the smallest quantity of water and that of a very stagnant nature.

It is in connection with the immature state of these insects that the odonatist has most opportunities of opening new ground, and it is a distinct advantage that he is able to carry on his observations and do most useful work during the winter and early spring. Of course some kind of vivaria will be required to contain the nymphs that are being bred. Mine consist of glass fish-globes filled with water, mud, and weeds, with a few sticks or reeds projecting about a foot above the surface of the water, so that no misfortune may happen when the time for the emergence of the dragonflies arrives. In these, last year, I reared *Æschna cyanea*, *Agrion puella*, *Ischnura elegans*, *Pyrrhosoma minium*, and *Erythromma najas*, the last two of which I have described and figured.

Nymph of Pyrrhosoma minium, Harr. (fig. 1).—In shape it is long and slender, though less so than some others of the *Agrionidæ:* length, including the caudal lamellæ, 19 mm., greatest breadth about 2·5 mm.: general ground colour dark sepia-brown. The head is somewhat rectangular, about 3·25 mm. by 1·75 mm.; the sides, however, slope

considerably backwards: eyes large, pear-shaped, situated at anterior corners of head, and each extending a third of the way across, in colour dark: between the eyes are three whitish spots as well as some dark markings: the occiput (for the shape of which see figure 1) bears centrally a palish rectangle with dark boundary and crossed by two small parallel lines: the posterior corners of the occiput bear conspicuous spines: antennæ 7-jointed, the third from the base darker than the rest, and all joints darker anteriorly: mask spoon-like, triangular, the base of the triangle, which is anterior, a convex curve, and the apex truncated; it extends to the insertion of the first pair of legs; the two moveable portions bear a row of hairs along the margin, and terminate in a pair of hooks, which interlace when the mask is drawn back and at rest. The prothorax is small, rectangular with the four corners removed, and bears some whitish markings, notably a streak in the middle line of the animal. Wing-cases long and straight. The legs are long, paler than the general ground colour, and are marked on the femora with two dark rings, and on the tibiæ with one rather faint one: the tarsal joints of all the legs are three in number, the basal one being very small. The abdomen tapers posteriorly, the segments being fairly equal: each except the tenth bears along its posterior margin a row of small white dots, and there is a whitish lateral line along each segment: in the mid-dorsal region is a pale line, having on each side of it a black dot in each segment except the tenth. The caudal lamellæ are 5·5 mm. in length; they have a sharp point at their extremity and a strong median vein: in colour they are pale, much blotched with brown and spotted with still darker brown. The end of the tenth segment of the abdomen is surrounded with small points, and between the dorsal and each of the lateral lamellæ is a small conical projection.

One specimen that could not find its way out of the water developed the crimson colouring under the pupal skin before being drowned. An imago, a great part of whose emergence I watched about 9 a.m. on April 26th, got its immature—yellowish—colouring during the day; but I have never kept one alive long enough for it to put on its full crimson dress.

Nymph of Erythromma najas, Hans. (fig. 2).—In shape it is very long and slender. Length, including the caudal lamellæ, 30 mm., greatest breadth about 3.75 mm.: general ground colour dark sepia-brown. Head rectangular, very narrow from front to back, 4·75 mm. by 2 mm.: eyes rather small, somewhat hemispherical, situated at anterior corners of head, dark in colour; between the eyes are a few dark dots and markings: on the central part of the occiput, which is very narrow, are also some dark markings, while its posterior corners bear conspicuous spines as in the last species; antennæ six-jointed, basal two stout and dark, next long, slender and dark, with a pale ring round centre, the rest short, pale and slender: the mask is scarcely to be distinguished from that of *P. minium*. The prothorax is small and pentagonal, the base being towards the head; on it are one or two dark lines. Compared with those of *P. minium* the wing-cases are short. The legs are rather long, paler than the general ground colour, and each carries two dark rings, one on each side of the junction of

femur and tibia; there are three tarsal joints to each leg, the basal one being very small: all the legs have several longitudinal rows of small dark points. The somewhat hairy abdomen tapers gradually to the posterior extremity, and is irrorated with small black dots: the segments are fairly equal, and each, except the tenth, is bounded posteriorly by a line of about eight white dots: each segment except the tenth has a lateral spine: a medio-dorsal pale line may just be distinguished, and on each side of it, rather nearer the hinder edge of each segment, is a pale mark: there is also a pale lateral line, but not showing so distinctly as in *P. minium*. Very different from those of the last species are the caudal lamellæ: they are 8 mm. long, and of much the same width throughout, about 2 mm.: the tip is rounded, and each lamella is divided into two parts; the basal half has the margin toothed, especially on the upper edge of the central one and the lower edge of the other two (for the outer ones are reversed in position): the decided nick on the more toothed margin is very noticeable: the apical half of the lamella has an entire margin,* and bears three transverse brown bands, and a longitudinal one along the median vein, which is stout: the venules have their smaller branches conspicuously dark in colour and arborescent in structure. The points and conical projections at the end of the abdomen resemble those of *P. minium*.

If these two descriptions are compared, it will be seen that the species are closely allied, but, just as in the perfect insects, the resemblances, though striking, are accompanied by numerous points of difference.

In the Libelluline group of dragonflies (*Libellulidæ*) are to be found ten British species—*Leucorrhinia dubia*, Lind., *Sympetrum vulgatum*, Linn. (= *striolatum*, Charp.), *S. flaveolum*, Linn., *S. sanguineum*, Müll., *S. scoticum*, Don., *Platetrum depressum*, Linn., *Libellula quadrimaculata*, Linn., *L. fulva*, Müll., *Orthetrum cærulescens*, Fabr., *O. cancellatum*, Linn., and one occasional visitant, *S. fonscolombii*, Selys. Of these, during the season, I secured six—*S. vulgatum*, *S. scoticum*, *P. depressum*, *L. quadrimaculata*, *O. cærulescens*, and *O. cancellatum*.

S. vulgatum I took commonly in Surrey and in the New Forest. One I probably saw as early as June 28th, near Pyrford, Surrey; but my first capture was a female on July 5th in the New Forest; and the last I saw were on Sept. 20th, at the Black Pond, in Surrey. They were very plentiful near Wisley, in Surrey, in the middle of the month last named. Specimens vary considerably in size and in the amount of red in their colouring: the wings, too, are sometimes very dark, age probably being the cause of the darkening. *S. scoticum* I captured in two localities only (both in Surrey), where, however, they were very plentiful. The first one was met with on July 11th, at the Black Pond, and it was still on the wing there on Sept. 20th. This species also varies considerably in size, a female taken

* When a lamella is prepared in canada-balsam for viewing with a compound microscope, the apex is found to be fringed with fairly long, but very *slender, colourless hairs*, not shown in the figure.

on Sept. 9th being very small. Darkening of the wings does not occur, but the females show a varying amount of orange colouration at the base. A remarkable point in connection with this dragonfly is the striking difference between the yellow colour of the immature insect and the almost black tint of the adult.

Whether *P. depressum* was scarcer than usual last season I cannot say, but I noted it on four occasions only, three being in Surrey—a female on May 10th; another on June 1st, on the wing, between 5.30 and 6 p.m.; and a third on June 14th; while as late as Aug. 2nd I took yet another female, in the New Forest, with the blue colouration on the abdomen as in the male. This one was very late in the summer; can it be that the blue colour was due to age?

This season I did not meet with *L. quadrimaculata* till May 10th, when it was out in good numbers at the Black Pond. By June 14th its numbers were fewer, and it was almost over on July 19th. I also found the species near Brockenhurst on July 5th; in good numbers over ponds near Wisley on May 17th and 23rd; and in smaller numbers at the Basingstoke Canal on May 23rd and June 20th. The Four-spotted Dragonfly is given to vary in two directions. Sometimes a dark cloudy colouration is developed on the four wings in the region of the pterostigma, while again (and often in the same individual) the saffron tinge found at the base of the wings may spread along the costal region almost to the tip of the wings. There seemed to me to be more instances than usual of both varieties last season, and I took three very nice specimens of the former (*prænubilia*, Newm.), which are usually scarce. At the Black Pond, on June 21st, a male was secured eating a *P. minium:* this is the first time I have observed cannibalistic tendencies in a dragonfly, as well as the first time I have seen one of these insects fall a prey to another animal.

O. cærulescens I met with only in the New Forest, where in several localities it was plentiful at the beginning of August. The males appeared to be less common and more difficult to catch than the females, which are very liable to be confused with *S. vulgatum:* the former, however, were not usually secured over water, as were the latter. *O. cancellatum* was just coming on the wing on May 17th near Wisley, and I took an immature female. On July 26th I spent some time trying without success in Richmond Park, to catch what could scarcely have been anything else than a fine male of this species.

Four of the *Corduliidæ* are found in Britain—*Cordulia arctica*, Zett., *C. metallica*, Lind., *C. ænea*, Linn., and *C. curtisii*, Dale. Of these I came across one only—*C. ænea*—in 1896, and but few specimens of this. The dates were, at the Black Pond on May 10th, May 31st, and June 14th; at the Basingstoke Canal on May 23rd.

Of the *Gomphidæ* but two species are natives of Britain—

Gomphus vulgatissimus, Linn., and *Cordulegaster annulatus*, Latr.; and of these two I met with only one last season, *C. annulatus*. On July 5th I secured three males in the New Forest, and also had one brought to me that was taken the same day near Ottershaw, in Surrey. On Aug. 6th and 12th I took, in the New Forest, six specimens in all, only one of which was a female. This dragonfly, in the Forest, in almost every instance was flying backwards and forwards along the streams close to the surface of the water, and it was usually not difficult to intercept it in its course and effect a capture. None of the Odonata give greater satisfaction than does this one, for, if ordinary care is used in abstracting the contents of the abdomen, the insect in the cabinet looks almost as bright as when it was freshly caught.

Coming now to the *Æschnidæ*, we find eight species inhabitants of our islands:—*Anax formosus*, Lind., *Brachytron pratense*, Müll., *Æschna mixta*, Latr., *Æ. borealis*, Zett., *Æ. juncea*, Linn., *Æ. cyanea*, Müll., *Æ. grandis*, Linn., *Æ. rufescens*, Lind.; and of these I met last season with all except three—*Æ. mixta*, *Æ. borealis*, and *Æ. rufescens*; but with the exception of *A. formosus*, which was common at the Black Pond, they appeared to me to be in smaller numbers than usual.

Of *A. formosus* I secured a good number of specimens, all but one being males; several, however, were in poor condition, the cause perhaps being that they cut their wings when flying amongst the reeds. They were taken on June 14th, 21st, 27th, and July 11th and 19th, all at the Black Pond. On June 20th I saw one taken at the Basingstoke Canal near Byfleet. At the Black Pond, when not on the wing during the day, they seem to rest down amongst the reeds; but as their time for retiring approaches they fly higher, amongst the firs, where probably they roost. It is surprising at what a distance this dragonfly can see a comparatively small insect, which, nevertheless, it often turns away from when within a few inches of it. *B. pratense* I saw at Wisley Ponds on May 17th, and near Byfleet on May 23rd. Of *Æ. juncea* I took but two—one, a female, at the Black Pond on Sept. 15th, as she was resting on the surface of the water ovipositing; and a male on Sept. 16th at Wisley Ponds. *Æ. cyanea* was seen on several occasions, notably at Bagley Wood, Berks, in the middle of August, but no captures were made. I, however, bred a female on April 26th, and another on May 25th. One *Æ. grandis* fell to my net on August 20th at Hincksey near Oxford. I probably saw it first on July 11th, and last on Sept. 9th.

Both British species of the *Calopterygidæ* I met with in large numbers last season—*Calopteryx virgo*, Linn., in the New Forest; and *C. splendens*, Harr., at many places in Surrey. *C. virgo* was observed on July 5th, and again during the first fortnight in

August. It haunts the banks of streams, especially where there is plenty of vegetation. On July 5th I secured a male with its right fore wing wanting in the blue pigment. This is not an uncommon aberration; sometimes all the wings are similarly deficient, and this brown-winged form was named by Stephens *anceps*. In Surrey *C. splendens* seems also to like the banks of streams and canals where the vegetation is luxuriant. I found it last season in large numbers, my first specimen being seen on May 17th, and the last on June 28th, when, however, the insect was probably by no means over. I met with a few stragglers at the Black Pond, where I had not observed it before.

Amongst the *Agrionidæ* are to be found twelve British species:—*Lestes nympha*, Selys, *L. sponsa*, Hans., *Platycnemis pennipes*, Pall., *Erythromma najas*, Hans., *Pyrrhosoma minium*, Harr., *P. tenellum*, Vill., *Ischnura pumilio*, Charp., *I. elegans*, Lind., *Agrion pulchellum*, Lind, *A. puella*, Linn., *A. mercuriale*, Charp., and *A. cyathigerum*, Charp. Of these I took last season all except *L. nympha*, *I. pumilio*, and *A. mercuriale*.

Three male *L. sponsa* were netted in the New Forest on Aug. 10th, over a tiny pond from which the water had gone, leaving only weeds and mud.

Of *P. pennipes* I took two in the New Forest on July 5th, and a good number near Pyrford, in Surrey, on June 28th. Most of those in Surrey were caught along a ditch about a couple of yards wide, where they flew close to the water, the bluer specimens looking like *A. puella* or *A. cyathigerum*. Two or three were taken over grass. The colour of the female, which is considerably more robust than the male, is yellowish, sometimes with a greenish tinge: the male varies from yellowish white to pale blue, the head being of a blue with a slightly green tinge. The markings are black, and they vary to a much greater extent than does the ground colour. The feathered legs are very distinctive.

Early in May I bred a few examples of *E. najas* from nymphs taken from the Basingstoke Canal on April 25th. On May 17th two were taken near Wisley, and on May 23rd and June 20th I took them in plenty over the Basingstoke Canal. Most of the mature insects were flying, often at a fair pace, over the water, and kept out of reach, seeming to be timid of one's approach. They often settled on *Potamogeton* or some similar floating weed, if not sometimes on the water itself. The immature insects seemed to keep away from the water. On the wing the male somewhat closely resembles a rather bulky *I. elegans*.

P. minium began to emerge indoors as early as April 7th, but the first outdoor specimens I saw occurred at the Black Pond on May 2nd. The last specimen noticed was in the New Forest on Aug. 3rd. *P. tenellum* was coming on the wing at the Black Pond on June 14th, and I took my last specimen at the same

place on Sept. 15th. On Aug. 4th I came across it in the New Forest.

On May 24th I first met with *I. elegans* on Wimbledon Common, and the last I saw was in the New Forest on Aug. 4th. I also found it near Byfleet; near Pyrford, and in Richmond Park, in Surrey; and in Bushey Park, in Middlesex. On June 20th I took by the Basingstoke Canal two with orange markings on the thorax, which perhaps belonged to a variety parallel with *rubellum* of Curtis in the case of *I. pumilio*.

Of *A. pulchellum* I took one on May 6th at Wisley Ponds, and a few on May 23rd and June 20th in a very restricted spot by the Basingstoke Canal. *A. puella* was first seen at the Black Pond on May 3rd, and last at the same place on July 19th. I took it also in several other spots in Surrey. It is doubtless true that this insect seldom inhabits the same locality as its near relative *A. cyathigerum;* nevertheless it was in fair numbers amongst the swarms of the latter at the Black Pond last season. *A. cyathigerum* was noted as occurring in the New Forest and in several localities in Surrey, my first date for it being May 10th, and the last Sept. 20th. The distinguishing mark on the second segment of the abdomen varies considerably.

Of the thirty-nine species of British dragonflies it will be seen that I met last season with no fewer than twenty-four, and those in three districts only—Mid-Surrey, the New Forest, and Oxford, the last of which might almost be omitted.

21, Knight's Park, Kingston-on-Thames.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from vol. xxix. p. 235.)

Rivula sericealis, *Scop.*—Everywhere abundant.

Zanthognatha grisealis, *Hb.*—Widely distributed. Kingstown (*B.*), Belfast (*W.*); Cromlyn, Westmeath; Armagh (*J.*); Kenmare; Markree; Farnham, &c.

Zanthognatha tarsipennalis, *Tr.*—Fairly common. Galway (*B.*) and Clonbrock; Cromlyn (*Mrs. B.*); Markree, and near Sligo (*R.*); Banagher; Farnham; Castle Bellingham (*Th.*), &c.

(Pechypogon barbalis, *Clerck.*—Stated to have been taken near Belfast (*W.*); but I have not authenticated the record.)

Bomolocha fontis, *Thnb.*—Not rare in Kerry about Killarney and Kenmare; shores of L. Foyle near Derry (*W. E. H.* and *C.*); Ardrahan, Co. Galway; Cappagh, Co. Waterford.

HYPENA PROBOSCIDALIS, *L.*—Everywhere abundant.

HYPENODES COSTÆSTRIGALIS, *St.*—Cork (*S.*); Markree Castle, Sligo; Ardtully, Co. Kerry.

THOLOMIGES TURFOSALIS, *Wk.*—Common at Killarney (*B.*).

BREPHOS PARTHENIAS, *L.*—Westmeath (*Miss R.*).

GEOMETRÆ.

UROPTERYX SAMBUCARIA, *L.*—Widely distributed, but very variable in numerical distribution. Often abundant in the suburbs of towns, as Kingstown and elsewhere near Dublin; and in some country districts, as near Kenmare, and at Drumreaske. A few localities are appended to illustrate its range of occurrence. Sparingly about Inishowen and Derry (*W. E. H.* and *C.*); Armagh and Carlingford (*J.*); near Belfast, common (*W.*); Westmeath, occasional; Cappagh, Co. Waterford; Bandon and Doneraile, Co. Cork.

EPIONE PARALELLARIA, *Schiff.*—Erroneously recorded from Powerscourt. The only Irish locality seems to be Clonbrock, Co. Galway, where Mr. Dillon has bred a few, and captured a number in flight.

EPIONE APICIARIA, *Schiff.*—Very widely distributed, and locally sometimes rather numerous, as at Belfast (*W.*); Derry (*C.*) and Donegal; it occurs also at Markree Castle and Lissadell, &c., near Sligo; Enniskillen; Favour Royal, Tyrone; Armagh (*J.*); Farnham, Cavan; Castle Bellingham (*Th.*); Killynon, Westmeath (*Miss R.*); Clonbrock and Ardrahan, Co. Galway; Bray, Powerscourt, and Greystones, Wicklow; Mallow, &c.

RUMIA LUTEOLATA, *L.*—Everywhere abundant.

VENILIA MACULARIA, *L.*—Very local, but numerous where found, and variable in marking; but I have seen no specimens of var. *quadrimaculata*. Powerscourt (*B.*) and Devil's Glen (*Bw.*), Wicklow; Cappagh, Co. Waterford, and Ardtully (*Miss V.*), and Cloonee, Co. Kerry; near Cork (*Sandford*); Clonbrock (*R. E. D.*), Castle Taylor (*Miss N.*), and near Galway (*A.*); Rockwood, near Sligo. I have no northern localities.

ANGERONA PRUNARIA, *L.*—Apparently confined like the preceding to the S. and W. of Ireland, where locally numerous. The banded form of both sexes occurs. Clonbrock (*R. E. D.*), Galway; Cratloe near Limerick; Glengarriff (*Carpenter*), and about Killarney; Cappagh, Co. Waterford (*Miss V.*).

METROCAMPA MARGARITARIA, *L.*—Throughout Ireland. Often common.

ELLOPIA PROSAPIARIA, *L.*—This pine-feeding Geometer, if strictly restricted to that food-plant, must have (like *Panolis*

piniperda) been introduced into this country during the last few hundred years, when settlers began to import and plant conifers, the indigenous pine having become extinct about the time of Elizabeth. According to 'Cybele Hibernica' there is no satisfactory proof of the survival of our native *Pinus sylvestris*. The forests of Wicklow, in which some 900 years ago the King of Leinster cut a tribute of fir masts for Brian Boru, survives only in oak and other trees which spring from the stools, or the free-seeding birch. Nevertheless this moth is now very widely distributed, and sometimes not uncommon. The green variety *prasinaria*, Hb., has not yet been observed; but one or two dingy examples, in which the pink tint is scarcely to be traced, have been taken at Castle Bellingham (*Thornhill*) and near Sligo (*R.*). Pale specimens also occur, and the transverse bars vary in strength of marking. Localities: abundant near Derry (*C.*) and Belfast (*W.*); Newcastle, Co. Down (*Bw.*); Stranorlar, Donegal; Markree, Hollybrook, and Sligo; Tempo Manor near Enniskillen (*Langham*); Favour Royal, Tyrone; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Westmeath; Toberdaly, King's Co.; Castle Bellingham (*Th.*); Howth, Balbriggan, and one at the lighthouse at Rockabill three miles off the Dublin coast; Powerscourt (*B.*), Killarney, Bray (*S.*), and Greystones, Wicklow; Portarlington (*B.*); Dromana, Cappagh, Co. Waterford (*Miss V.*); Markree, Hollybrook, and Sligo; Moycullen (*Miss R.*), Clonbrock (*R. E. D.*), and Woodlawn (*A.*); in Cork, abundant; and at Killarney, Cloonee L., Glenflesk, Glengarriff, the shores of Bantry Bay and Crookhaven, Kerry, &c.

Eurymene dolobraria, *L.*—Recorded as Irish by the late Alex. R. Haliday. Single examples have been captured by Dr. Cosgrave at Swords, Co. Dublin; Mr. Donovan at Mucross; Mrs. Battersby at Cromlyn and Killynon (*Miss R.*), Westmeath; Rockwood, Sligo (*McC.*); and Tempo Manor, Enniskillen (*Langham*). I have taken several at Drumreaske, Monaghan, and Merlin Park, Galway; and at Clonbrock it is fairly numerous, Mr. Dillon having taken both the imagines and larvæ freely; and these specimens are unusually large and fine.

Pericallia syringaria, *L.*—One at Cappagh, Co. Waterford (*U.*); several at Clonbrock (*R. E. D.*).

Selenia bilunaria, *Esp.*—Very widely spread; from Derry (*W. E. H.*) and Ballycastle, Co. Antrim, to Cork. In some places. as at Favour Royal, Tyrone, and Castle Bellingham, Louth, very plentiful. Irish specimens of the spring emergence seem to me remarkable both in richness of colour and size, often being nearly two inches in expanse. The summer form, *juliaria*, also occurs.

Selenia lunaria, *Schiff.*—Very local. First recorded from Powerscourt, Co. Wicklow, by Mr. Barrett, where in 1889 I

again met with a few specimens. It is also to be found at Hollybrook, Co. Sligo (*Miss ff.*); Killynon, Westmeath (*Miss R.*); Favour Royal, Tyrone; and Enniskillen; but except at Clonbrock, Co. Galway, where several have been captured by Mr. Dillon, single specimens only have been taken. The summer form, *delunaria*, has not been yet noticed in Ireland to my knowledge.

SELENIA TETRALUNARIA, *Hufn.*—Not known, except at Clonbrock, whence Mr. Dillon reports numerous captures.

ODONTOPERA BIDENTATA, *Clerck.*—Everywhere numerous. Very dusky brown forms occur with the outer margin external to the elbowed line darkly shaded. Every gradation of paler forms, some tinted with ferruginous, are also to be found, with the markings sometimes strongly and sometimes slightly represented. A very remarkable aberration, with speckled ochreous ground colour and very dark transverse lines and discoidal spots, occurs rarely, which I have not seen in English collections. Some specimens have the two transverse lines of the fore wing joined by a longitudinal streak beneath the discoidal spot, formed by the darkening of that portion of the median nervure.

CROCALLIS ELINGUARIA, *L.*—Very widely met with, but not usually in any numbers. It varies somewhat in the tint of the median band, which sometimes is strongly coloured.

(To be continued.)

SILK-PRODUCING LEPIDOPTERA.

BY ALFRED WAILLY.

(Concluded from vol. xxix. p. 356.)

European Species.

Of the six species I am going to name, only one produces silk of any value, that is *Lasiocampa otus*, found in Turkey, Hungary, and Asia Minor. *Saturnia isabellæ* has a thin cocoon of rather fine silk; the others produce coarse silk.

ATTACUS PYRI, S. V., Godart (*Saturnia pavonia major*, Linn.). Central and Southern Europe. The larva feeds on peach, almond, pear, apple, plum, elm, ash, and other trees. In France the larva reaches its full size in August. It forms its cocoon on walls, between branches or at the foot of trees.

ATTACUS CARPINI, S. V., God., Dup., Bdv. (*Saturnia pavonia minor*, L.) All over Europe, even in the North of England. The larva feeds on elm, hornbeam, birch, willow, blackthorn,

bramble, heath, &c. This species is earlier than the preceding one, the moths emerging generally in April. The larvæ hatch in May, form their cocoons, of a pear-like shape, about the middle of July, in the bushes.

ATTACUS SPINI, Borkhausen (*Saturnia pavonia media*, Fab.). Germany, Austria, Hungary. This species, it is said, can only pair in the open air. I could never obtain the reproduction of this species in captivity after several years' trial. In 1881, with forty cocoons, I only obtained seven or eight moths; the pupæ, like those of *A. pyri* and *A. carpini*, remaining two and sometimes three years before the emergence of the moths. The *spini* moths, in 1881, commenced to emerge on April 17th, the *carpini* on the 30th. From this, *spini* would appear to be a still earlier species than *carpini*. The larva feeds on the blackthorn (*Prunus spinosa*). The cocoon is larger and more silky than that of *carpini*, and it has an oval shape. The moth, somewhat similar to that of *pyri*, but of course much smaller, is of the same colour and size in both sexes; whereas, as is well known, there is a striking difference in size and colour between the male and female *carpini*.

SATURNIA CŒCIGENA, Hübner. Dalmatia, Turkey, Asia Minor. From information just received, I learn that this species hybernates in the ovum state, and the larva feeds on oak.

SATURNIA (*Actias*) ISABELLÆ. Central Spain. Splendid species, discovered by M. Meig, described and figured in the 'Annales de la Société Entomologique de France,' 1850, p. 241, pl. viii., by Professor Graells. The moth is of a deep green, with brown nervures. The larva is green, the head and the middle of the segments brown, and there are two long red spots bordered with white along each segment; it feeds on the forest pine (*Pinus sylvestris*).

BOMBYX (*Lasiocampa*) OTUS, Drury. This silk-producing Bombyx is, it is said, that from which the Greeks and the Romans obtained their silk before the introduction of the mulberry silkworm from China. What has become of this famous silkworm? One of my correspondents in Sicily, M. J. Pincitore Marott, of Palermo, in an article which appeared on August 1st, 1873, in the 'Petites Nouvelles Entomologiques,' speaks of the discovery and propagation of this remarkable silkworm in Italy, and in a passage of his report he says:—"The *Bombyx otus* is of great importance, for its silk-producing caterpillar may perhaps replace that of the *Bombyx mori*; the silk obtained from this species is almost as fine as that produced by the *Yama-maï*. The true country of *B. otus* being Asia Minor, its discovery in Italy proves that our climatic conditions and flora, at least in part, are somewhat similar to those of the East, and that the rearing of *B. otus* could be done successfully. M. Correale, of Scandole, near Crotone in Calabria, was the first

to discovered the *otus* moths in Italy, and his attempts to rear this species on a large scale, up to the present, have been crowned with success." These remarks were published by Professor Cornalia, in the 'Annali di Storia Naturale,' vol. viii., 1865. M. Marott adds that the *B. otus* was not rare in 1873 in southern parts of continental Italy, and that he found it also in the environs of Monte-Cuccio (Palermo). The larva of *B. otus* feeds on the lentisk (*Pistacia lentiscus*), a shrub which grows naturally on the coasts of the Mediterranean, in Africa, Syria, Greece, Turkey, and other parts. Live cocoons of *otus* can now be easily obtained, and in 1889 I had a quantity of them sent to me by a naturalist of Zara, Dalmatia, who reared the larvæ on a species of evergreen oak (*Quercus ilex*). The cocoons are white, very rich in silk, and very large, the female cocoons being about three inches in length and wide in proportion. The difficulty in rearing this species would, I think, be that of keeping the insect during the winter, as it hybernates in the larval state, like all species of the same genus. Besides lentisk and oak, the *otus* larva can also live on ash and cypress.

American Species.

In my various reports, English and French, I have spoken of the rearing in Europe of the principal wild silkworms of the United States of North America. With respect to the others, I shall only be able to give their names according to the list given by Aug. R. Grote, President of the Entomological Club of New York, and published in 1882.

TELEA POLYPHEMUS (*Telea*, Hübner; *polyphemus*, Cramer). The best wild silkworm of the United States, with a closed cocoon like those of the genus *Antheræa*, of which it has all the characteristics. The silk of *T. polyphemus* is white, and in quality it fully equals that of *A. pernyi*, but the cocoon is generally smaller. In Europe this species has been reared in the open air with the greatest success on oak. It is difficult to obtain the pairing of the moths in captivity, and the best thing to do is, as with *Yama-maï*, to place the cages containing the moths in the open air. *T. polyphemus* is very polyphagous, and is found on birch, beech, willow, hazel, chestnut, &c. The larva, which is one of the handsomest, has five stages. It is white in the first; in the other four stages it is of a beautiful green. The head is light brown, but it has no dots like that of *Antheræa pernyi*. The base of each tubercle is silvery white, with metallic reflection. The following are names of trees and shrubs given as food-plants of *T. polyphemus* by American entomologists:—*Quercus*, *Ulmus*, *Tilia americana*, *Rosa*, *Acer*, *Salix*, *Populus*, *Corylus*, *Betula*, *Vaccinium*, *Juglans nigra*, *J. cinerea*, *Cratægus*, *Quercus virens*, *Prunus virginiana*, *Platanus*, *Castanea vesca*, *Fagus*, *Tilia europæa*, *Carya tomentosa*, *Alnus incana*, &c.

PLATYSAMIA CECROPIA (*Attacus cecropia*, Linn.). *Platysamia* is the generic name given to this species and the three following ones, which are all closely-allied species. *P. cecropia* is the largest silk-producer in the United States. The cocoon, open like those of the same genus, is surrounded by a large irregular envelope, which is often of an extraordinary size. The larva has six stages (some authors say it has but five); is more difficult to rear in the open air in northern countries than *T. polyphemus*. It feeds on a great number of fruit and other trees, especially wild plum, willow, &c. The moths pair easily in captivity. Brodie, in 'Papilio,' February, 1883, gives a list of forty-nine species of plants belonging to the following genera:—*Tilia*, *Acer*, *Prunus*, *Spiræa*, *Cratægus*, *Pyrus*, *Amelanchier*, *Ribes*, *Sambucus*, *Ulmus*, *Quercus*, *Fagus*, *Corylus*, *Carpinus*, *Betula*, *Alnus*, *Salix*, and *Populus*. Other authors give the following genera:—*Berberis*, *Liriodendron*, *Syringa*, *Carya*, *Gleditschia*, *Rubus*, *Ceanothus*, *Ampelopsis*, *Cephalanthus*, *Fraxinus*, *Vaccinium*, and *Rosa*.

PLATYSAMIA CEANOTHI, Behr (*californica*, Gr.). A species smaller than *P. cecropia*. The envelope, which is iron-grey and pyriform, is much larger in proportion than the true cocoon inside, the space between the two being rather considerable. The larva of this species has been reared in Europe on plum and willow. Probably it would live on several of the same food-plants as *P. cecropia* and *P. gloveri*. The name of *ceanothi* is derived from one of its principal food-plants, *Ceanothus americanus*. The larva, as well as that of *P. gloveri*, is very similar to that of *P. cecropia*, especially in the first two stages. From the third stage the difference, the most striking, is that the dorsal tubercles of *ceanothi* and *gloveri* are of a uniform colour, orange-red or yellow, whilst the first four tubercles on the back of the *cecropia* larva are red, and the others yellow. The lateral tubercles are blue on the three species. The *ceanothi* moths have the background of the fore wings of a reddish brown; on the contrary, the colours vary in the other two species. The moths do not pair so easily as those of *cecropia*.

PLATYSAMIA GLOVERI, Strecker. A species which is intermediate between *P. cecropia* and *P. ceanothi* in size and colouring of the wings. The envelope of the cocoon is silvery grey; the true cocoon is dark brown. The outer envelope adheres to the cocoon, leaving no space between the two. This species was discovered in Utah, where cocoons were found on a small leaf sallow. It is also found in Arizona.

P. cecropia, *P. ceanothi*, and *P. gloveri*, being closely-allied species, pair readily among themselves, and very interesting hybrids have been obtained by the crossing of *cecropia* with *ceanothi* and *cecropia* and *gloveri*.

PLATYSAMIA COLUMBIA, Smith. This species, somewhat

similar to *P. gloveri*, is found in various states and parts of Canada.

CALLOSAMIA PROMETHEA (*Attacus promethea*, Drury). *Callosamia* is the generic name given by Packard. The cocoon of this species somewhat resembles that of *Attacus cynthia*, but is smaller and more elongated; the species altogether is smaller. The larva can easily be bred in the open air on lilac or cherry, if the larvæ do not hatch too late in the summer. In America the larva feeds on the *Sassafras* (wild cherry), *Cephalanthus*, *Laurus*, *Benzoin*, *Syringa*, *Berberis*, *Betula*, *Acer*, *Quercus*, *Pinus*, *Fagus*, *Liriodendron*, *Populus*, apple, pear, peach, &c. According to W. H. Edwards, the larva of *C. promethea* has but three moults or four stages in Western Virginia.

CALLOSAMIA ANGULIFERA, Walker. A species which is said to feed on the tulip tree; is very similar to *C. promethea*, but the colours on the wings are the same in both sexes, whilst in *promethea* they are very dissimilar.

PHILOSAMIA CYNTHIA, Grote (*Attacus cynthia*, Drury). This is the *Attacus cynthia* mentioned before, a native of China, and now naturalised in the United States.

ATTACUS SPLENDIDUS, B. (*Saturnia galbina; Saturnia*, Krank; *galbina*, Clem.; *Saturnia mendocino*, Behrens).

ACTIAS LUNA (*Attacus luna*, Linn.). *Actias*, generic name, given by Leach. A species smaller, but resembling the *A. selene* of India. The cocoon, closed like those of the same genus, is irregular, and has but little silk. In the United States the species is double-brooded. The larva, which is green, with red tubercles, has often been reared in Europe, where it seems to prefer walnut; it is, however, very polyphagous. The food-plants mentioned by American entomologists on which the larvæ are said to be found are the following:—*Juglans cinerea*, *Carya porcina*, *Quercus*, *Plantanus*, *Liquidambar*, *Fagus*, *Betula*, *Salix*, *Ostrya virginica*, *Castanea*, and plum.

HYPERCHIRIA IO, Fabricius. The larva of this species forms its pupa in a light cocoon or shell on the surface of the ground; it is covered with tufts of stiff hairs, which sting like nettles. It is easy to rear in captivity. The moths, which are very handsome and differ in the sexes, pair easily. The larva, which has six stages, has been reared in Europe on oak, willow, plum, apple, &c. In America it is found on *Populus balsamifera*, *Ulmus*, *Zea mays*, *Cornus*, *Sassafras*, *Quercus*, *Robinia viscosa*, *Cornus florida*, *Liriodendron*, *Humulus*, *Gossypium*, *Acer*, *Salix*, *Populus tremuloides*, *Robinia pseudo-acacia*, *Cerasus virginiana*, *Betula*, *Fraxinus*, *Rubus villosus*, *Trifolium pratense*, &c.

ATTACUS AUROTA, Cramer. Large and fine species, somewhat resembling *Attacus atlas*, being sometimes called the South American *atlas*. It is found in the Guianas, other parts of Central America, and Brazil, where there is a variety bearing

the name *Attacus speculifer*. The cocoon, which is very thick and rich in silk, has the same form as that of *A. atlas*. *A. aurota*, according to a former correspondent, Mr. A. Michély, who has been dead some years, has six generations each year in French Guiana. The moths emerge a month after the formation of the cocoon; the eggs hatch a week after they have been laid; and twenty days after, the formation of the cocoon takes place. This is one of the species which it would be advisable to rear on a large scale in its native country for manufacturing purposes. The silk, although rather coarse in appearance, is brilliant and abundant. *A. aurota* has been reared by Mr. Michély in French Guiana on the orange tree and on *Eucalyptus*; it can also be bred on *Ailanthus*, *Ricinus*, *Cascaria ramiflora*, manioc (*Jatropha manihot*), bamboo, and other plants.

ATTACUS HESPERUS. Another species the moth of which is magnificent. The cocoon is firm, smooth, without any floss, of a dark brown, and about the size of *Attacus cynthia*, but it is more perfect in shape than *cynthia*. Mr. Michély says the larva can live on the same plants as *A. aurota*, and that it forms its cocoon fifteen days only after its hatching. There are, he says, five species of silk-producing Bombyces in Guiana.

Among other American species we must quote the following, described in the 'Transactions of the Entomological Society of London' in 1884, by Westwood (T. I., p. 38):—

SATURNIA ORIZABA, Westwood. Mexico.
S. VORULLA, Westwood. Mexico.
S. LAVENTERA, Westwood. Mexico.
S. GELLETA, Westwood. Mexico.
S. ZACATECA, Westwood. Bogota.
EUCHEIRA SOCIALIS, Westwood. Mexico.

Tudor Villa, Norbiton, Surrey.

NOTES AND OBSERVATIONS.

"APPLE TREES AND WINGLESS MOTHS."—The "case that the males *do* carry up the wingless females" (Entom. xxvi. 20) is not mine. It is that of the 'Standard' correspondent. But it had my respect from the first, for it was entirely free from hypothetical language. And I must confess that, as I go farther into it, my respect ripens into faith. Mr. Mitchell may think this a state of things with which "few practical entomologists will agree." Then let us go to the practical entomologist! Let us consult that charming book of Miss E. A. Ormerod's—a book which should be in the hands of every farmer, fruitgrower, gardener, and entomologist—'A Manual of Injurious Insects, and Methods of Prevention.' Turning to page 349, under the head of *Cheimatobia brumata*, Miss Ormerod says:—"Another point is *the transportation of the wingless female* winter moths to the trees by the males

whilst pairing. This point was not sufficiently observed, until within the last two or three years, to be taken into practical consideration; but it bears to a very important extent on presence of attack." We may depend upon it this observation represents a consensus of opinion from practical people who have to deal seriously with insect pests, and whose knowledge of such insects is not inferior to that of the brethren of the net. Whether it refers to fruit or forest trees, of course, matters not. The "case," then, is simply this:—greased bands, properly prepared, are very effective in dealing with wingless moths, but not entirely so. Mr. Mitchell is a little hard, and too general, I think, in his criticism of "newspaper entomology." In a journal like the 'Standard,' correspondence is passed through a discriminating sieve by experts. And here is another testimonial to the press, from Miss Ormerod, It appears at page xii, in the preface to her book:—"I should fail in what is a duty as well as a pleasure if I did not mention, with many thanks, the encouragement and help ever heartily and courteously accorded to me by our agricultural, and often by our general, press."—J. Arkle; Chester.

Tortrix pyrastrana.—One day last June I bred a female of this species which I killed and pinned to a sheet of cork whereon there were a number of other insects waiting to be set. The window of my room was open; and while I was engaged setting, a male *T. pyrastrana* flew in and came towards the table, and fluttered backwards and forwards over the piece of cork, and at last settled down in the midst of the group of moths, and ran to and fro until he had discovered the dead female, whereupon he immediately attempted nuptial rites. I blew him away, but he came back again; and again I blew him away, but he persisted in returning; so I got a pill-box ready and tried to box him as he was flying round, when all at once, to my surprise, he went right into the box, and was promptly secured. It is very probable that this box had contained the female, and was therefore an attraction in itself. Eventually he joined his wished-for mate on the setting-board.—Gervase F. Mathew; H.M.S. 'Hawke,' Dec. 23rd, 1896.

Cheimatobia brumata.—As there seemed a large number of males of *C. brumata* about at the end of November, my brother and I went to search in our kitchen garden for the females. We got fifty-four in five days; so there ought to be a good many larvæ less next spring. We found the best time was between 6 and 7 o'clock. They were nearly always *in cop.*, and generally beneath the first branch. I do not think the males carry up the females, as on two or three occasions we saw the male fly away after copulation; the female then ran up the tree some way, remained still, but we never saw any laying eggs. They varied very much both in size and colour, some being quite black.—H. M. Edelsten; The Elms, Forty Hill, Enfield, N., Jan. 1st.

High-flat Setting.—What should they know of England who only England know? May I be allowed to prolong the discussion on high setting of Lepidoptera? It is a question which affects me more than most of your correspondents. Mr. Sabine writes (Entom. xxix. 359), "It seems to me that we collectors of British insects are desired *to set our specimens* flat, simply for the benefit or convenience

of those who go in for foreign insects as well." This is correct, but the inconvenience to the collector of extra-British insects under the present system is so great that it is hardly right to pass over it as unworthy of attention. I have for many years collected British and foreign insects. As it is impossible, without exchanging (or buying) specimens, to obtain anything like a good collection, I naturally resort to exchange on a fairly large scale. What is the result? My collection is a heterogeneous mixture of high, medium, and low-set specimens, with wings curved or flat, sloping up or down or arranged horizontally. Short of resetting everything this is unavoidable. Now, if it be Mr. Sabine's intention (and that of those who argue with him) to discourage the collection of any but British Lepidoptera, he is undoubtedly right. But does he realise that the excellent work done in Britain, by the comparison of local varieties with one another, is but half complete if they are not compared with the continental forms of the same insects? We are blessed with such a wide variety of climate and weather in our happy isles, that a very large range of variety, in many species, may be fonnd without crossing the Channel; but why throw obstacles in the way of those who would complete the series by adding, say, polar or southern forms of the same species? It is immaterial, in my opinion, whether entomologists set insects high or low; both ways have advantages; high-set are safer to pack for posting, and extremely convenient for putting locality and other labels beneath. Personally, though I admire a well-set English specimen, curved wings are to me the *ne plus ultra* of artificiality; it is, however, very material that lepidopterists all the world over should adopt a uniform system; and as we are hardly likely to convert the rest of Europe, America, the colonies, in fact all the world, except our own little islands, to our method of setting, the sooner we abandon it for the universal one the better. As to English setting being the "hall-mark" of a British insect, if the hall-mark is not written on the insect by Nature's hand it is not worth much, except perhaps from a pecuniary point of view. If an English specimen differs in any way from a foreign one, the hall-mark is not needed; if it does not so differ, a locality label meets the purpose equally well. As Mr. Jacoby points out, setting is no guarantee against fraud. One distinct and immediate advantage of uniform setting would be the greater ease with which good specimens which are common abroad (*Cinxia*, for instance) could be obtained, which would help to save many of our rarities from extinction. In conclusion, let me state that I am not arguing on the merits of the two opposing systems of setting, as I have, alas! hundreds of both in my collection, but simply on the advisability of the general adoption of the uniform system obtaining all over the world. The following are the advantages I claim:—It would facilitate foreign exchange, and increase the knowledge of the distribution of British species outside Britain, if not of extra-British species. It would give greater facilities for the determination of new British species, the guesswork handling of which at present is rather woeful. It would give collectors of Europeans fair play, both in regard to the beauty of their collections and in exchange abroad (the continental collector objects to English-set specimens as much as the hardened *Britisher to high-set* ones). It would bring us in line in this matter

with the rest of the civilized world. Foreign setting-boards generally slope a trifle *upwards*.—J. C. WARBURG; Cannes.

THALPOCHARES PAULA, Hb., IN BRITAIN.—Mr. C. W. Dale asks (*ante*, p. 17) whether this species is British, and since I can answer his question in the affirmative, and am the owner of the specimen to which he alludes as having stood as *T. paula* in Mr. C. A. Briggs's collection, I am writing these lines to dispel his doubts. The moth referred to is unquestionably *T. paula;* and although Mr. Dale says "it is certainly very different to any foreign specimens of *T. paula* which I have seen," and "it far more resembles foreign specimens of *T. parva*," I can assure him that it agrees absolutely with all the British and continental examples of *T. paula*, and differs essentially from those of *T. parva* which I have examined. It is the actual specimen captured by Mr. J. Moore, at Freshwater, Isle of Wight, in June, 1872, and alluded to by Mr. Barrett in Ent. Mo. Mag. x. 19 (Mr. Dale by a slip gives the reference as "ix. 19"), and by Dr. H. G. Knaggs in Ent. Ann. 1874, p. 156. Mr. Moore, whose initials Mr. Barrett (*loc. cit.*) gives as "E. G." in mistake for "J.," was personally known to the late Mr. Howard Vaughan and to Mr. C. A. Briggs, and was thoroughly reliable, though I believe that his name was, in later years, used for fraudulent purposes by unscrupulous dealers. Besides this specimen Mr. Barrett (*l. c.*) mentions two other *T. paula*, which I have also seen; the history of one is unknown, but there is every reason to believe that the other was taken on the south coast by a schoolboy years ago. There may be one or two other genuine British specimens in this country, but I have no particulars of their capture at hand. Mr. Dale evidently thinks that Messrs. Barrett and Meyrick have applied the names "*parva*" and "*paula*" to different species; but a careful comparison of their descriptions to which he refers, as well of those of Dr. Knaggs in Ent. Ann. 1874, pp. 157–8, with authentic examples of both insects, shows clearly that all three authors have applied the names quite correctly and to the same species, and that the supposed discrepancies arise from his having failed to notice that whereas Mr. Barrett's distinctions are based on the character of the *fasciæ*, Mr. Meyrick's rest upon the character of the *lines*. Some of the differences between *T. parva* and *T. paula* are well pointed out by Dr. H. G. Knaggs in Ent. Ann. 1874, pp. 157–8; and a good enlarged coloured figure of the former, of which I myself captured a specimen in this district on June 8th, 1892 (Ent. Mo. Mag. Ser. 2, iii. 308), will be found on the frontispiece in Ent. Ann. 1859, though Newman ('British Moths,' p. 448) makes the extraordinary comment that from the figure he "should have supposed this insect to be the female of *ostrina!*" I would strongly advise Mr. Dale to examine the very long and beautiful series of *T. parva* and *T. paula* in the general collection at the British Museum (Natural History), as they will show him well the peculiar characteristics of each species: the majority of the specimens came out of the collections of the late Professors Zeller and Frey, whose ideas as to the correct application of the names agreed precisely with those of Messrs. Barrett, Knaggs, Meyrick, and myself. In support of his suggestion that *T. paula* is not British, Mr. Dale, following

Mr. Barrett (Ent. Mo. Mag. x. 20), says that the larva feeds on *Gnaphalium arenarium*, which is not a British plant; but it is also known to feed on other species of *Gnaphalium*, and several occur in this country. In any case, however, I regard *T. paula*, *T. parva*, *T. ostrina*, and certain other insects in the British list, as merely accidental visitors, which at best can only continue their race in this climate for a few months, and are quite unable in any stage to survive our winters. — EUSTACE R. BANKES; The Rectory, Corfe Castle, January 1st. 1897.

CAPTURES AND FIELD REPORTS.

VANESSA ANTIOPA AT GORLESTON, NEAR GREAT YARMOUTH.—I saw a specimen of *Euvanessa* [*Vanessa*] *antiopa* on Sept. 8th, when walking on the pier on the Gorleston side of Yarmouth harbour-mouth. I did not attempt to catch it, as I do not believe in capturing every rare butterfly as soon as it is espied, especially when one is sure of its identity; but I got quite near to it, and could plainly see it had the yellow border of the continental form, whence I infer it had come across lodged on the rigging of some ship.—ALBERT H. WATERS, B.A.; Cambridge.

MOTHS TAKEN AT ELECTRIC LIGHT, EALING. — The following list testifies to the fact of an erroneous belief among my friends here, whose assertion is that this vicinity, in such near proximity to London, generally rewarded the entomologist with few and unimportant captures. I merely tried this place as an experiment, on July 5th and August 3rd and 20th respectively, which yielded contrary results:—*Smerinthus populi*, *S. tiliæ*, *Zeuzera æsculi* (male and female), *Cossus ligniperda* (in good condition), *Arctia caia*, *Spilosoma fuliginosa* (one dark variety), *S. menthastri*, *S. lubricipeda*, *Liparis chrysorrhœa*, *L. salicis*, *Orgyia antiqua*, *Lasiocampa quercifolia*, *Pterostoma palpina*, *Notodonta dictæa*, *Phalera bucephala*, *Drepana hamula*, *Bryophila perla* (on the under surface of this moth's wings a number of small red parasites adhered to the costa), *Acronycta tridens*, *A. psi*, *A. aceris*, *A. megacephala* (the last very numerous), *Leucania lithargyria*, *L. pallens*, *L. comma*, *Tapinostola fulva*, *Axylia putris*, *Hydræcia nictitans*, *H. micacea*, *Xylophasia lithoxylea*, *X. polyodon* (it could be seen how plentiful this moth had been by the wings, the remainder having been eaten by the bats), *Neuria saponariæ*, *Neuronia popularis*, *Luperina testacea* (on the posts), *Mamestra anceps*, *M. persicariæ*, *Dicranura vinula*, *Apamea oculea* (plentiful), *Miana fasciuncula*, *Agrotis puta*, *A. exclamationis* (one variety having the dark markings totally obliterated), *Triphæna pronuba* (many rufous and light varieties), *Noctua c-nigrum*, *N. xanthographa*, *Calymnia trapezina*, *Hecatera dysodea*. *Phlogophora meticulosa* (scarcer than last year), *Hadena oleracea*, *Cucullia umbratica*, *Plusia chrysitis*, *P. gamma*, *P. iota*, *Amphipyra tragopogonis*, *Catocala nupta* (in good numbers), *Mania typica Epione apiciaria*, *Rumia cratægata*, *Uropteryx sambucata* (plentiful, one I took having the hind wings aberrant), *Eugonia fuscantaria*, *E. angularia*, *Amphidasys betularia* (a dark form), *Boarmia rhomboidaria* (common), *Pelurga comitata*, *Hemithea thymiaria*, *Eupithecia subfulvata*, *E. centaureata*, *Timandra amataria*, *Melanippe fluctuata*, *Melanthia ocellata*. The Pyralides were fairly represented.—*H. W. BELL-MARLEY*; Ravenscourt Park, Sept. 5th, 1896.

THE ENTOMOLOGIST

VOL. XXX.] MARCH, 1897. [No. 406.

ABERRATIONS OF *EPINEPHELE HYPERANTHUS*.

FIG. 1.

FIG. 2.

THE first specimen is interesting, as it shows considerable bilateral asymmetry in the markings of the hind wings, the left wing being normal and the right curiously blotched; but the most interesting point seems to me to be the fact that the aberration in the ocellar marks is entirely confined to the black and yellow zones, the central white pupils being in each case quite normal in position and, except in the ocellus next to the anterior margin, of the normal size. This is of course contrary to the general rule enunciated by Bateson and others, that "speaking generally, such reduction commonly occurs by diminution of the diameter of the whole spot; but if any of its component parts are wanting the *centre* is the first to disappear, then the next innermost band, and so on."* Bateson himself, however, points out that the rule is not a universal one, and in fact in *E. hyperanthus*, as far as I can judge, from the specimens I have seen in which the ocelli on all the wings are hardly recognisable var. *arete*, it is the central white pupil that

* Bateson, 'Materials for Study of Variation,' p. 291.

persists and the marginal zones that disappear, although where one ocellus disappears at the end of a series the rule generally holds good.

The specimen, fig. 1, seems to be a case of discontinuous variation. I have never seen anything approximating to an intermediate condition between it and the normal, and, judging from the fact that it is confined to one side, and that the wing showing the aberration is slightly crippled, it would appear to be due to some cause at work during pupal life, and in such a case it would probably not be hereditary. In one sense it may be regarded as an instance of ocellar *enlargement*, since the marginal zones of four of the ocelli extend so far over the surface of the wing as to blend into one another, almost forming transverse bands across the wings; and it is noteworthy that in all the ordinary varieties of *E. hyperanthus* in which the ocellus is enlarged, that I have come across, the central pupil is enlarged more or less in proportion to the enlargement of the marginal zones, as is very well shown in the lanceolate variety, fig. 2; and in such cases a practically complete series of intermediate forms is obtainable with little difficulty. It may be worth noting that the neuration is apparently quite normal in both cases.

My thanks are due to my friend Mr. Hayward for the care and skill he has displayed in photographing the specimens for me.

F. P. Bedford.

FUNGI *versus* ANDROCONIA.

Referring to Mr. Rickard's paper on "Butterfly Scales," in the January (1897) number of the 'Entomologist' (*ante*, p. 1), I would like to refer him to a paper just published at Cambridge, Mass., by A. G. Mayer, as a bulletin of the Museum of Comparative Zoology, on "The Development of the Wing-scales and their Pigment in Butterflies and Moths." I think he will find on close examination that by his test all the wing-scales are really fungi. I have requested that a copy of the paper be sent to the 'Entomologist,' and have no doubt that Mr. Rickard can secure it for examination and study. It seems to me that the proper method of bringing this whole subject to a final conclusion would be for Mr. Rickard, or some one who agrees with his views in the matter, to study the development of these scales in *Pieris rapæ* in the same manner in which Mr. Mayer has studied the development of the normal wing-scales. I must confess that nothing that has been added in the most recent contribution to this subject has served to change my expressed views.

John B. Smith.

Rutgers College, Jan. 13th, 1897.

THE PROBABLE CHEMICAL AND PHYSICAL NATURE OF THE PIGMENTS OF LEPIDOPTERA.*

ONLY a beginning has, as yet, been made in the study of the nature of the pigment substances that are found within the scales of Lepidoptera. Coste † and Urech ‡ have carried out extensive series of experiments which show that many of the pigment substances may be dissolved out of the scales by means of chemical reagents, giving coloured solutions, and leaving the scales white or colourless. They have also shown that some of these pigments may be changed in colour by the action of reagents, and then restored to their original colour by the use of other reagents, For example, many reds are changed to yellow by the action of HCl or HNO_3, and may be restored to the original red colour by the use of ammonia. Their researches show that reds, yellows, browns, and blacks are always due to pigments. In a few cases, greens, blues, violets, purples, and whites are also due to pigments, and not, as is usually the case, to structural conditions, such as striæ upon the scales, &c.

It is probable that the most universal pigment colours to be met with in the Lepidoptera are the yellowish buff and brown-drab tints, and this is especially true of the nocturnal forms. The diurnal forms have almost a monopoly of the brilliant reds and yellows and the rich blacks, but it is interesting to note that yellowish buff or brown tints are still very common upon those portions of their wings that are hidden from the light, such as the upper costal edge of the hind wing, which is usually concealed from view beneath the overlapping fore wing. Wallace § has called attention to the fact that a yellowish or buff tint is one of the commonest and most widespread colours in Lepidoptera.

Concerning the chemical nature of the pigment substances within the scales, but little has as yet been made known. Hopkins ‖ finds that the white pigments in the Pieridæ are due

* Excerpt from "The Development of the Wing-Scales and their Pigment in Butterflies and Moths." By Alfred Goldsborough Mayer. ('Bulletin of the Museum of Comparative Zoology at Harvard College,' vol. xxix., No. 5). 1896.

† "Contributions to the Chemistry of Insect Colours" 'The Entomologist,' vol. xxiii. pp. 128–132, 155–167, 181–187, 217–223, 247–252, 283–287, 309–314, 338–343, 370–374 (1890), and vol. xxiv. pp. 9–15, &c.). 1890–91.

‡ "Beiträge zur Kenntnis der Farbe von Insektenschuppen" (Zeitschr. f. wiss. Zool. Bd. lvii. Heft 2, pp. 306–384). 1893–94.

§ 'Darwinism.' 494 pp. London and New York. 1889.

‖ "Uric Acid Derivatives functioning as Pigments in Butterflies" (Abstr. of Proc. Chem. Soc. Lond. 1889, p. 117; also 'Nature,' vol. xl. p. 335). 1889. —"Pigment in Yellow Butterflies" ('Nature,' vol. xlv. p. 197). 1891.— "The Pigments of the Pieridæ" (Proc. Roy. Soc. Lond. vol. lvii. No. 340, pp. 5, 6). 1894.

to uric acid, and also that the red and yellow pigments are due to two closely related derivatives of uric acid. These uric acid derivatives used in ornamentation are apparently confined to the Pieridæ among butterflies. For when a pierid mimics an insect of another family, the pigments in the two cases are chemically quite distinct. This is well seen in the genera *Leptalis* (Pieridæ) and *Mechanitis* (Danaidæ).

Further, Griffiths * has shown that the green pigment found in several species of *Papilio*, *Hesperia*, and *Limenitis* among butterflies, and of Noctuidæ, Geometridæ, and Sphingidæ among moths, also consists of a derivative of uric acid, to which he gives the name "lepidopteric" acid, and assigns the empirical formula $C_{11}H_{10}Az\ N_8O_{10}$. By prolonged boiling in HCl it is converted into uric acid.

Urech † demonstrated that in a large number of Lepidoptera the colour of the urine that is voided upon emergence from the chrysalis is similar to the principal colour of the scales.

Landois ‡ many years ago made a careful study of the constitution of the blood of several species of beetles and butterflies. He found that when the blood is allowed to evaporate in the air, crystals separate out. He also found that the blood consists chiefly of egg albumen, but that globulin, fibrin, and iron are also present. He called attention to the fact that the freshly drawn blood of the larvæ of Lepidoptera is usually light in colour, but that when it is allowed to dry in the air it generally becomes brownish or yellowish; and further, that while the colours of the bloods are different for different species, it is very remarkable that the colour which is assumed by the *dried* blood is apt to be similar to the ground colour of the wings of the mature insect from which the blood is drawn.

As before stated, I believe that the pigments of the scales are derived from the hæmolymph or blood of the chrysalis, and my chief reason for believing this is that I can find no evidence that there is anything but hæmolymph within the scales during the time when the pigment is formed. In considering the phenomena of pigmentation, therefore, it is important to know as much as possible about the physical and chemical properties of the hæmolymph of the pupa. Accordingly, I have devoted some time to the study of the properties of the pupal hæmolymph of the large Saturnidæ, *Samia cecropia*, *Callosamia promethea*, and *Philosamia cynthia*. The hæmolymph is under considerable

* "Recherches sur les Couleurs de quelques Insectes" ('Comptes Rendus,' Acad. Sci. Paris, tome cxv. pp. 958, 959). 1892.

† "Beobachtungen über die verschiedenen Schuppenfarben und die zeitliche Succession ihres Auftretens" (Zoolog. Anzeiger, Bd. xiv. pp. 466–473). 1891.

‡ "Beobachtungen über das Blut der Insecten" (Zeitschr. f. wiss. Zool. Bd. xiv. pp. 55–70, Taf. vii.–ix.). 1864.

pressure in the chrysalis, and when an incision is made near the shoulders of the wing cases it spurts out in large drops. I have made a chemical analysis of it, and find that its chief constituent is egg albumen, but that globulin and fibrin are also present. When the hæmolymph is agitated with ether, the proteid substances are coagulated, and a clear amber-yellow solution is left. This amber-yellow solution may then be decanted off from the congealed proteids. When thus isolated the proteids are slightly yellowish, but they soon dry into a drab-coloured mass, very much as the hæmolymph itself does upon exposure to the air. Spectrum analysis shows that the clear amber-yellow solution owes its yellow colour to xanthophyll. It will be remembered that Poulton* found that the green and yellow colours of many lepidopterous larvæ and pupæ were due to chlorophyll and xanthophyll derived from the leaves of their food-plants. The hæmolymph is acid to litmus, and I find that it actually contains a large amount of orthophosphoric acid (ammonium molybdate test). Mr. George Oenslager has kindly determined the mineral bases of the hæmolymph for me, and finds them to be iron, potassium, and sodium. The iron is present in considerable quantity.

Although the freshly obtained hæmolymph is a clear opalescent amber-yellow fluid, it soon becomes turbid upon exposure to the air, and in less than half an hour after removal from the chrysalis becomes opaque, and drab or greenish drab in colour. It is interesting to note that the drab colour assumed by the dried hæmolymph from the pupa of *C. promethea* is very similar to the drab of the outer edges of the mature wings. In the case of *P. cynthia*, also, the hæmolymph dries into a greenish drab colour, which is strikingly similar to the principal colour of the moth's wings. In the case of *S. cecropia*, however, the hæmolymph becomes rather greener in colour than the drab of the mature wings.

This curious change in colour which the hæmolymph exhibits upon exposure to the air is probably not a simple process of oxidation, for it will take place in an atmosphere of hydrogen, although rather more slowly than in the air. An atmosphere of CO_2, however, practically prevents it, for after remaining for forty-eight hours in this gas, the hæmolymph shows only faint traces of a drab-coloured clot around the edges of the liquid, which remains clear and amber-yellow in colour. If the hæmolymph be sealed up air-tight in glass tubes it will retain its clear amber-yellow colour indefinitely. When the newly extracted clear amber-coloured hæmolymph is heated to 54° C., it begins to congeal, and at temperatures above 63° C., it rapidly solidifies into a chrome-yellow-coloured mass. In this condition it will

* "The Essential Nature of the Colouring of Phytophagous Larvæ and their Pupæ, &c." (Proc. Roy. Soc. Lond. vol. xxxviii. pp. 269–315), 1884–85.

keep indefinitely, always retaining its original chrome-yellow colour. In like manner congelation can be produced in hæmolymph that has become drab by exposure to the air, only in this case the congealed mass is drab, not chrome-yellow in colour.

If, in accordance with my hypothesis, it be true that the colours of the mature wing are derived, by various chemical processes, from the hæmolymph of the pupa, then one ought to be able to manufacture various colours from the hæmolymph by means of chemical reagents. Also, if the colour so manufactured be similar to some colour upon the mature wing, it may be expected to present reactions to chemical reagents similar to those of the colour on the wing. As far as my rather limited experiments go, I find this to be the case. For example, if one treat the hæmolymph of *S. cecropia* with warm concentrated HNO_3, it congeals into a deep chrome-yellow mass. If now ammonia be added in excess, it changes to a reddish orange, which is very similar in colour to the reddish orange band that crosses the upper surface of the hind wings of the moth. Now this reddish orange band of the moth is changed to chrome-yellow by HCl or HNO_3, and then, if ammonia be added, the original red colour reappears; this alternation of red and yellow may be produced indefinitely by the successive additions of ammonia and acid. Exactly the same sequence of reactions is produced with the red pigment derived from the hæmolymph; HCl or HNO_3, causes it to become chrome-yellow, and then ammonia restores the original red colour.

Another confirmatory test of a similar nature may be performed as follows: A portion of the drab-coloured outer edge of the wing of *S. cecropia* is treated with warm HNO_3 and the acid evaporated off at a gentle heat. By this means the pigment of the scales is changed to a deep chrome-yellow; if ammonia be then added, it becomes reddish. Very similar reactions are obtained from the hæmolymph after it has congealed, in the air, into a greenish drab mass.

Another experiment which I have tried is the following:—The freshly drawn hæmolymph from a pupa of *C. promethea* is congealed by heat into a chrome-yellow-coloured mass, then HCl_3 and a small crystal of $KClO_3$ are added, and the acid is evaporated off at a gentle heat. By this means a purple mass is produced, which is changed to drab by HNO_3. The purple spots near the outer edges of the hind wing of the female moth are also changed to drab by HNO_3.

Still another confirmatory experiment may be given. The drab hæmolpymh of *C. promethea* is dissolved and changed to a sepia-brown colour by warm HCl, to which a crystal of $KClO_3$ is added. An exactly similar change occurs when the drab-coloured outer edges of the moth's wings are treated in a similar manner.

It is well known that the most universal colours of the more lowly organized moths are the drab-grey and yellow-drab tints; and this is what one would expect according to my hypothesis, for these are the colours that are derived from the hæmolymphs by mere exposure to the air. Ths brilliant yellows, reds, &c., are the result of more or less complex chemical processes, which have been slowly effected, probably through the agency of natural selection.

In connection with the phenomena of pigmentation it is interesting to note that while uric acid may easily be demonstrated by the murexide test in the fluids of the alimentary tract of the *pupæ* of the Saturnidæ, it is never present in the hæmolymph of the *imago;* nor can I detect it in the drab-coloured pigment of the outer edges of the wings. The amount of uric acid in the fluids of the alimentary tract of the pupa increases as the pupa becomes older, so that the fluid which is voided upon emergence is always strongly impregnated with it. In the case of *Pieris rapæ* there is no uric acid either in the alimentary tract or hæmolymph of the larva, but it is present in the *alimentary tract* of the pupa. It seems to me probable that the uric acid of the alimentary tract of the pupa may be a product of the metabolism of the hæmolymph that is removed from the fluids of the body by the Malpighian tubules.

THE PROBABLE CAUSES OF THE DECADENCE OF BRITISH RHOPALOCERA.

By W. Harcourt-Bath.

At the meeting of the Entomological Society of London when this subject was brought forward for discussion, judging from the report which is published in the 'Proceedings,' one cannot avoid being considerably struck with the almost total absence of any suggestions advanced by the speakers from a purely evolutionary point of view. One must, therefore, accordingly draw the conclusion that the principles and theories propounded by that great naturalist the late Charles Darwin, and his able successor Dr. Alfred Russel Wallace, have not succeeded in obtaining many adherents among the Fellows of the learned Society under consideration. The chief factors in deciding the decadence of British Rhopalocera, which the majority of those who spoke at the meeting seemed to consider, were adverse climatic influences, and no suggestions or hints were thrown out whatever in support of the hypothesis of the organic environment possessing a preponderating influence in the determination.

With due respect to the learning and reputation of some of those who gave expression to their views upon the above-mentioned occasion, permit me to say that personally I consider the climatal conditions to have played quite a subordinate part in causing the decadence of the indigenous insects under discussion.

From the point of view of an orthodox evolutionist of the natural selection school, the primary factors in the matter, to my mind, are insular isolation coupled with the consequent concomitant powerful operation of the law of amixia. This hypothesis is supported by the fact that nearly all the species which have been extirpated or are at present on the point of extermination possess comparatively weak powers of flight, at the same time they do not contain in their ranks any species with a very pronounced predilection for migrating. At any rate, they all belong to that class which are not known to immigrate periodically to this country from the Continent. On the other hand, many of those species which maintain their existence perennially in these inhospitable isles are frequently known to come across the English Channel, occasionally in large swarms, such for instance as *Pieris brassicæ*, *P. rapæ*, *P. napi*, and *Vanessa atalanta*; while others, such as *Vanessa cardui* and *Colias hyale*, would not probably permanently occur in this country for more than a few years at the most, were it not for these remarkable peregrinating powers which they possess.

This isolation from the Continent is therefore, in my opinion, the primary cause of the decadence phenomenon under discussion, and the law of amixia comes into operation as a necessary consequence. As a rule all those species which subject themselves to its despotic influence, namely, the prevention of crossing by isolation, have as a result the degeneration of their physical powers, their fecundity undergoes a deterioration, the number of ova which they produce is thus probably considerably below the average, and the offspring at the same time do not possess sufficient of the necessary vitality and vigour to enable them to contend successfully with the numerous enemies by which they are surrounded.

Another very probable cause of the gradual extinction of some of our indigenous Rhopalocera is to be found in the increasing number of their enemies which subsist exclusively upon insects for food. Contrary to that which is the case in most parts of the Continent (at least according to my circumscribed experience), the number of individuals of insectivorous birds in this country is exceedingly great. This has been brought about both by reason of their legislative protection and the merciless war waged by gamekeepers against the hawks and owls which prey upon them. At the same time, from the latter cause also, the number of insectivorous animals (*Talpa* and

Sorex, &c.), as well as batrachians and certain reptiles, have probably undergone an increase, these creatures largely constituting the food of several members of the rapacious family of *Accipitres* alluded to, as is well known to those of the ornithological fraternity. When the balance of nature is thus so completely upset, something must suffer as a direct result thereof; and this in my idea accounts in a large degree for the growing scarcity and looming final extinction of several members of our already too poor Rhopalocera fauna.

In support of this contention may be mentioned the fact that in France insects of all orders have undergone an increase since the fashion came into force for small birds to be utilised for millinery purposes, in conjunction with the demand for them as articles of food. This has resulted in the extirpation of nearly all the small birds in the country named, the consequence of which has been for several years past the dreadful destruction of the crops by the undue multiplication of the insect hordes.

As regards the adverse influences of the climatal conditions, these in my estimation, as previously stated, play quite a subordinate part in the matter, and probably only act indirectly, at least in the majority of instances. They are possibly usually more apparent than real. When, however, a species has been so reduced by the operation of the aforesaid law of amixia, combined with the inimical influences of the organic environment in the manner I have indicated, I am quite willing to concede that the climatal conditions, such as a succession of wet summers or a continuance of mild winters, sometimes successfully closes the chapter. Other adverse influences may be at work at the same time, such as the extirpation of their pabula by drainage and conflagration, and the extension of cultivation, as well as in several other ways which have from time to time been adduced. All these are silently but as surely assisting the adverse influences of the organic environment in their fatal task of extermination.

Rapacious collectors are undoubtedly responsible for the existing scarcity of several species in certain localities, two instances of which have come under my own knowledge during the last summer. A resident collector at Arley, in Staffordshire, informs me that *Melitæa aurinia* used to occur in abundance on the opposite side of the Severn before several members of a certain Society recently succeeded in reducing it to the brink of extermination by collecting all the larvæ and imagines which they could meet with for several seasons in succession. Another instance was related to me in connection with *Lycæna arion* in the Cotswolds by an Oxford Don, who attributes the entire extirpation of this butterfly, in one of its very best stations in the district named, to the rapacity of a particular individual "who scraped up about a bushel of its pabulum" in the hope

of being able to procure the larvæ; since which date it has entirely disappeared.

Leucophasia sinapis is also rapidly approaching extermination in the Midlands, owing to the greediness of collectors.

Before concluding I will endeavour to furnish a few suggestions as to the best means which I consider can be adopted in order to counteract, if possible, the lamentable state of things which constitutes the subject of these remarks.

Assuming that the effects of amixia are primarily responsible for the decadence of the butterflies, the best thing under the circumstances would probably be to infuse "fresh blood"—if I may be permitted to employ a metaphorical expression—into those colonies which still exist, in the same way as has been suggested in order to save the few remaining herds of the European bison which still survive in the wilds of Lithuania and the Caucasus. Could not a few males or females of certain declining species be brought over from the Continent and permitted to fly in some of the well-known haunts, for instance, of *Lycæna arion*, *Melitæa cinxia*, &c.? At any rate the experiment might be given a fair trial during some favourable season.

As regards endeavouring either to prevent or persuade the majority of collectors in this country from taking long series of rare species bordering upon extinction, whenever they have the opportunity, all such efforts I think must prove futile. The acquisitive instinct of the average British collector is too overpowering to induce him to withstand the temptation.

Moreover, do all the principal entomologists and collectors themselves in the Metropolitan Society set a proper example in this respect? Judging from the accounts of the public sales which periodically take place under the hammer, I should venture to suggest that such is not the case with very many of them.

If something could be done to discourage the ravages of omnivorous and indiscriminate unscientific collectors and rapacious dealers, some good results would undoubtedly accrue.

Birmingham, Nov. 14th, 1896.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 39.)

Eugonia alniaria, *L.*—Restricted in distribution, but locally abundant. I have never met with it. Kildare, Hon. Emily Lawless (E. M. M. iv. 283); Cromlyn, Co. Westmeath (*Mrs. B.*); Enniskillen (*S.*); Greystones, Co. Wicklow (*Wynne*); Clonbrock (*R. E. D.*).

EUGONIA FUSCANTARIA, *Haw.*—I have never met with this species, and record it doubtfully, as the var. *infuscata* of *E. quercinaria* is easily confounded with it. The only two records are Clonbrock (*R. E. D.*), and at Mallow Mr. Francis Stawell writes that it is fairly abundant.

EUGONIA EROSARIA, *Bork.*—Very rare. Cork and Derry (*B.*); one at Howth, Co. Dublin; four at Clonbrock (*R. E. D.*).

EUGONIA QUERCINARIA, *Hufn.*—Common in many places (*B.*), but restricted to locality. Near Derry (*C.*); Hazlewood, Co. Sligo; Mote Park, Roscommon; Clonbrock. The var. *infuscata* usually occurs with the type.

HIMERA PENNARIA, *L.*—Appears to be local, but numerous in some wooded districts. Mr. Birchall took it abundantly, but has not recorded the localities. Killarney; Clonbrock, by Mr. Dillon and myself; Markree Castle, Sligo; Cromlyn, Co. Westmeath (*Mrs. B.*); near Derry, a few (*C.*); Armagh (*J.*); Ballygawley and Favour Royal, Tyrone; Carrickmines, &c., Co. Dublin; Devil's Glen, Co. Wicklow.

PHIGALIA PEDARIA, *Fb.*—Decidedly scarce in Ireland, though widely distributed. Belfast is the only district whence it is reported (by Mr. Watts) as frequent; and the type there is large and pale, with distinct markings. The Rev. James Bristow also reports it thence from Colin Glen. Examples have been taken at the following localities: near Derry (*W. E. H.*); Sligo (*R.*); Clonbrock (*R. E. D.*) and near Galway (*A.*); Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Westmeath; Tullamore, King's Co.; Armagh (*J.*); Phœnix Park and elsewhere in Co. Dublin.

NYSSIA ZONARIA, *Schiff.*—Mr. Campbell, of Derry, was the first to discover an Irish habitat for this species, having taken the larvæ several years ago at Ballycastle, Co. Antrim, some of which were forwarded to me for identification. The imago was subsequently captured freely by Mr. Bristow and others. An example has also been forwarded to the Dublin Natural History Museum by Mr. Sheridan, the intelligent proprietor of the hotel, Achill I., off the coast of Mayo. In 1896 Mr. Halbert, of the Dublin Museum, Mr. Dillon, and myself took a good many specimens near Slyne Head and at Roundstone on the Connemara coast. It seems probable in view of the wide separation of these localities that most of the numerous sandhills which extend along the Mayo and Connemara littoral will be found to harbour colonies of this species. Mr. Dillon contributes a remarkable record (Ent. xxvii. 190) of the occurrence of larvæ at Clonbrock in the same county, but some thirty miles inland, from which he had bred a female on August 19th, 1891, which, when taken to the locality frequented by the larvæ, attracted a wild male. The only note of an autumnal season of emergence,

either Continental or British, that I can find, is in Merrin's 'Calendar,' which gives September, as well as the early spring months. Neither has the insect been found heretofore inland, except on the Continent, where it haunts bare places and clearings of woods in certain localities of Central France and elsewhere in April. There is considerable variation noticeable among the Irish specimens, chiefly with regard to the basal two-thirds of the male fore wing up to the first white bar. On the dark ground in some examples there are distinct white dashes, a pair at the base, two pairs in the median area, and three separate ones towards the apex. These vary greatly in size and definition, and in some Ballycastle specimens are quite absent, producing an approximation to the coloration of its congener *N. hispidaria*. On the other hand, a considerable proportion of those from Connemara have the wing entirely white, broken by dark nervures, and costa, and three strigæ parallel to the outer margin.

Biston hirtaria, *Clerck*.—Very local, and apparently never numerous. Specimens have occurred at Wicklow (*B.*); Farnham; Cavan; Hollybrook, Co. Sligo (*Miss ff.*); Killynon, Westmeath (*Miss R.*); and a few at Clonbrock (*R. E. D.*), Co. Galway.

Amphidasys strataria, *Hufn*.—Birchall records this from Wicklow (probably captured by Mr. Tardy); and this has since been confirmed by Mr. Maurice Fitzgibbon at Wooden Bridge and Professor Hart, who bred several from pupæ taken at Glenmalure. It is also fairly abundant at Clonbrock, whence I have a nice series of the ordinary, somewhat variable forms. Mr. Francis Stawell has taken it at Mallow, Co. Cork.

Amphidasys betularia, *L*.—Widely distributed, and often abundant in the larval stage. I have seen no remarkable variations from any Irish localities, except in a series bred by Mr. Thornhill, of Castle Bellingham, Co. Louth, from local larvæ. Of these the greater proportion are of the normal type, but among them is one specimen of var. *doubledayaria*, and several showing a tendency to the development of the black spots; one especially having large black costal blotches, which run into a series of spots, forming irregular transverse bands; the outer marginal area being also heavily blotched. Another is strongly powdered with black on the basal and costal areas. This is a very notable instance of the sporadic appearance of a melanic tendency in this species, and it will be interesting to observe whether the dark aberrations increase and supplant the type more or less in an Irish country district whose atmosphere is untainted by manufactory smoke, and not remarkable for any abnormal rainfall. The moth has been taken also in the following localities: Kingstown and elsewhere in the Co. Dublin;

Wicklow; Clonbulloge, King's Co. (*E. S.*); Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Westmeath; Enniskillen; near Derry (*W. E. H. & C.*); Hollybrook (*Miss ff.*); Markree Castle and about Sligo; Clonbrock (*R. E. D.*); Moycullen, Ardrahan (*Miss N.*), and Galway (*A.*); on the shores of L. Conn, Co. Mayo; Doneraile, Co. Cork (*Stawell*); Killarney and Kenmare.

CLEORA LICHENARIA, *Hufn.*—Widely distributed, and locally common. Varies considerably, but the darker forms are scarce. Co. Dublin and Lambay I.; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Co. Westmeath; Enniskillen and Tempo (*Langham*), Co. Fermanagh; Trillick, Co. Tyrone; Drumreaske, Co. Monaghan; Armagh (*J.*); Rathmullen, Co. Donegal (*C.*); Markree Castle and near Sligo (*R.*); Clonbrock, Co. Galway (*R. E. D.*); Shannon Harbour, King's Co.; Kenmare and Killarney; Kerry; Mallow (*Stawell*) and Glandore (*D.*), Co. Cork; Cappagh, Co. Waterford.

BOARMIA REPANDATA, *L.*—Everywhere numerous. Very variable; but a comparison of a large number of Irish specimens with an English series shows that the general ground colour is far lighter in the former. The prevailing Irish form is of a pale ferruginous brown, with indistinct and blurred design. This is common in Norway also. Occasionally there occur mottled forms, with strongly-marked strigæ, like the illustration in Newman, on a greyish or ferruginous ground; but I have seen none of these with rich dark brown ground, not uncommon in England. These strongly-marked forms are found at Killarney, Kenmare, and rarely at Mote Park, Roscommon; Cappagh, Co. Waterford; and Drumreaske. The Irish *B. repandata* may be divided roughly into two groups, namely those with some tone of brown ground colour, and those with grey. Ruddy warm browns are scarcely ever shown. Of the grey forms, one of the most remarkable is that with a whitish median band traversing a pale speckled wing, the strigæ, &c., being almost obsolete, the insect having a general resemblance to a small *Boarmia consortaria*, but less ochreous. This form occurs at Killarney, Kenmare, Sligo, Clonbrock, and sparingly elsewhere. It is also met with in Scandinavia. The almost unicolorous grey variety *destrigata*, Haw., with nearly obsolete markings, prevails as a local form in several Irish districts, as about Sligo and Castle Bellingham, and in the Co. Galway; and sparingly at Killarney and Kenmare. Specimens nearly approaching var. *sorodensium*, Weir (except in its blue tint and diminutive expanse), are met with. The handsome var. *conversaria*, Hb., is the most remarkable of the group with brown ground colour; and it is notable that while in the grey forms the median band tends to be paler, in the brown it becomes darker than the ground colour. This variety is not rare in certain localities, as at Newcastle, Co. Down (Buc.), and near

Kenmare; and is found also occasionally at Killarney; Cappagh (*Miss V.*) and Dromana, Co. Waterford; Greystones, Co. Wicklow, &c. The darkest unicolorous forms of this species are very rare in Ireland. I have one or two of bistre-brown or blackish tone, taken at Killarney and Castle Bellingham; but two sooty-black specimens, with a faint pale submarginal festooned line identical with the melanic Yorkshire variety, have been captured by Mr. Dillon at Clonbrock, Co. Galway; and somewhat resemble the black Swansea variety of *Tephrosia crepuscularia*. Curious aberrations may also be noted devoid of almost any markings, except a large dark blotch at the junction of the elbowed and submarginal lines, half-way between the anal angle and the costa of the fore wing, similar to that shown in *Tephrosia consonaria* I have not been able to trace any response to environment in the occurrence of any of the above forms or varieties in reference to their respective habitats. In Kerry the whitish and grey and melanic aberrations occur side by side. Probably, however, the whitish and grey forms would find themselves protected when resting on birch trees where they are numerous. I am inclined to think, from observations I have made, that these insects frequently choose a resting spot which conforms to the hue of their wings.

(To be continued.)

ON THE GENUS *GYMNOPLEURUS*, Illiger; WITH A LIST OF SPECIES AND DESCRIPTIONS OF TWO NEW GENERA.

By John W. Shipp.

The genus *Gymnopleurus* was founded by Illiger (Mag. ii. 1803, p. 199) for the receptacle of the section of the then Scarabæidæ (Ateuchini) having the dorsal margin of the first segment of the abdomen uncovered, and the elytra having the lateral margins strongly sinuate near the base.

The characters by which Macleay (Horæ Ent. p. 510 *et seq.*) sought to arrange the species in divisions were chiefly founded on the number of teeth on the clypeus, and other variable and slight characters.

This genus, of which sixty-two species were enumerated by Harold (Cat. Col. Scar. 1868), has since been augmented to 105; and I do not doubt that in a few years it will be still largely increased, now that the interior of the African continent is being opened up, and becoming more thickly populated.

The species of the genus are as follows:—

GYMNOPLEURUS, Illiger.

Mag. ii. 1803, p. 199; Muls., Col. Fr. Lamell. p. 53; Erichs., Nat. Ins. iii. p. 754; Reitter, Ver. Nat. Vereines Brunn, xxxi. p. 163.

[ETHIOPIAN REGION.]

1. *ænescens*, Wied., Germars, Mag. Ent. iv. p. 128, 1821.
   = *bufo*, Macleay, Horæ. Ent. p. 515.
   = *speciosus*, Dej., Cat. 3rd ed. p. 151.
   = *fulgidus*, Leach, MS.
   Cape of Good Hope.
2. *æneipes*, Fairm., Ann. Soc. Ent. Belg. xxxvii. 1893, p. 144.
   Oebbi, N. E. Africa.

2a. *æneus*, Har., Stett. Ent. Zeit. xxxvi. p. 453.
   Monrovia.

3. *æruginosus* (Koll. MS.), Harold, Col. Hefte ii. 1867, p. 94.
   Egypt; Kordofan.
4. *affinis*, Macleay, Hor. Ent. 1821, i. 2, p. 515.
   Senegal.
5. *anthracinus*, Klug, Sym. Phys. v. t. 41, f. 7.
   Arabia.
6. *atratus*, Klug, *l. c.*, f. 4.
   Arabia.
7. *atrovirens*, Kolbe, Stett. Ent. Zeit. 1895, p. 335.
   Victoria Nyanza, West.
8. *azureus*, Fabr., Syst. El. i. p. 57; Reiche, Voy. Gal. Abyss. 1850, p. 304; *Galinieri*, Reiche, MS.
   Abyssinia.
9. *bicolor*, Latr., Voy. Calliaud. iv. 1827, p. 281; Cast., Hist. Nat. ii. p. 71; Dej., Cat. 3rd ed. p. 151.
   = *cyanopterus*, Sturm., Cat. 1843, p. 319.
   Sennaar; Nubia; Mozambique; Egypt.
10. *bocandei*, Waterh., Ann. Mag. Nat. Hist. v. 1890, p. 368.
    Senegambia.
11. *cælatus*, Wied., *l. c.*, 1821, p. 127.
    = *bicolor*, Cast., Hist. Nat. ii. p. 72.
    = *lichensteinii*, Boh., Ins. Caffr. ii. p. 186; Cast., *l. c.*, p. 72; Illiger, Dej. Cat., *l. c.*, p. 151.
    = *macleayi*, Cast., *l. c.*, p. 72.
    = *leei*, Macleay, H. Ent. p. 514.
    Cape of Good Hope; Cape Colony.
12. *caffer*, Boh., *l. c.*, p. 181.
    Caffraria.
13. *chloris*, Klug, Monatsbr. Berl. Acad. 1855, p. 650; Peters, Reis. 1862, p. 215.
    Sena.
14. *cærulescens*, Oliv., Ent. i. 3, p. 189, t. 27, f. 231; Cast., l. c., p. 71.

var. *centralis*, Bates, P. Z. S. 1890, p. 482.
Senegal R.

15. *consanguineus*, Kolbe, Stett. Ent. Zeit. 1895, p. 334.
Victoria Nyanza.

16. *coracinus*, Boh., *l. c.*, p. 185.
Natal.

17. *crenulatus*, Kolbe, Stett. Ent. Zeit. 1895, p. 333.
Albert Edward Nyanza.

18. *cupreus*, Boh., *l. c.*, p. 185.
Caffraria.

19. *cupreovirens*, Kolbe, Stett. Ent. Zeit. 1895, p. 333.
Victoria Nyanza.

20. *delagorgei*, Waterh., Ann. Mag. Nat. Hist. (6), 1896, v. p. 370; Kolbe, Stett. Ent. Zeit. 1895, p. 335.
Natal.

21. *diffinis*, Waterh., *l. c.*, p. 372.
Senegal R.

22. *elegans*, Klug, Symb. Phys. v. t. 41, f. 6.
= *anaglypticus*, Sturm., Cat. p. 103.
Arabia.

23. *fastiditus*, Har., C. H. 1867, i. p. 74; Dej., Cat. p. 150; Kolbe, Stett. Ent. Zeit. 1895, p. 334.
capicola, Hope, MS.
= *mundus*, Macleay, H. Ent. p. 510.
Cape of Good Hope; Natal.

24. *fulgidus*, Oliv., Ent. p. 167, t. 22, f. 199; Macleay, *l. c.*, p. 515; Har., Col. Hefte viii. p. 5.
= *leei*, var., Fab. Syst. El. i. p. 58.
Senegal R.; Keren.

25. *hilaris*, Hope, Ann. Mag. Nat. Hist. ix. 1842, p. 494.
Sierra Leone.

26. *hildebranti*, Har., Deutsch. Ent. Zeit. xxxvi. 1875, p. 218.
N. Abyssinia.

27. *humanus*, Macleay, H. Ent. p. 514.
Cape of Good Hope.

28. *humeralis*, Klug, Mon. Berl. Ac. 1855, p. 650; Peters, Reis. p. 216, t. 12, f. 11, 1862.
Tette.

29. *indigaceus*, Reiche, Voy. Gallin. Abyss. 1850, p. 306, t. 18, f. 9.
= *cyaneus*, Roth., Wiegm. Archiv. 1851, i. p. 123.
Abyssinia; Tigre.

30. *ignitus*, Klug, Mon. Berl. Ac. 1855, p. 650; Peters, Reis. 1862, p. 217.
= *cæruleovirens*, Sturm. MS.
= *cupricollis*, Koll. MS.
= *dimidiatus*, Walth. MS.
var. = *thoracicus*, Har., C. H. iv. 1868, p. 79; Dup., Deg. Cat. 3rd ed. p. 151.

var. *læviuscula*, Kolbe, Stett. Ent. Zeit. 1895, p. 336.
Tanga; Pangani; Mombassa; Zanzibar; Lower Nubia.

31. *infranitens*, Fairm., Ann. Soc. Ent. Fr. (6), vii. p. 108.
E. Africa.

32 *jacksoni*, Waterh., Ann. Mag. Nat. Hist. v. 1890, p. 370.
E. Africa; Masai Land.

33. *krugeri*, Kolbe, Stett. Ent. Zeit. 1895, p. 336.
Masai Land; N. Usambara.

34. *lætus*, Hope, Ann. Mag. Nat. Hist. ix. 1842, p. 494
Cape Palmas.

35. *lævicollis*, Cast., *l. c.*, p. 71; Lansbr. Revoils. Faun. et Flor. Somali Ld. Col. p. 14; Har., Col. Hefte viii. p. 5.
= *kordofanus*, Koll. MS.
Sennaar; Somali Land; Keren; Lebka; Insaba.

36. *latreillei*, Cast., *l. c.*, p. 71.
= *viridis*, Dej., Cat. p. 151.
Nubia.

37. *leei*, Fabr., Ent. Syst. i. p. 65.
Cape of Good Hope.

38. *lugens*, Fairm., C. R. Ent. Belg. xxxv. p. cclxxxiv.
E. Africa.

39. *malleolus*, Kolbe, Stett. Ent. Zeit. 1895, p. 334.
Uganda; Lake Tanganjika.

40. *modestus*, Lansb., Notes Leyd. Mus. viii. p. 72; Shipp, Ent. 1895, p. 3.
Benguela

41. *mœrens*, Kolbe, Stett. Ent. Zeit. 1895, p. 335.
Witu, E. Africa.

42. *nitens*, Oliv., Ent. i. 3, p. 159, t. 7, f. 55; Cast., *l. c.*, p. 71.
= *corruscus*, Dup. Dej., Cat. p. 150.
Senegal R.

43. *olivaceus*, Quedenf., Berl. E. Zeit. xxviii. p. 269.
Malange.

44. *olivierii*, Cast., *l. c.*, p. 72.
= *micans*, Dej., Cat. p. 151.
Senegal R.

45. *peringueyi*, Shipp, Ent. 1895.
= *modestus*, Pering., T. S. Afr. Phil. Soc. iv. pt. 2, p. 94.
Beaufort West, Cape Colony.

46. *plicatus*, Fairm., Ann. Soc. Ent. Fr. (6) x. p. 547.
Obock.

47. *profanus*, Fabr., Ent. Syst. i. p. 64; Cast., *l. c*, p. 72.
Guinea.

48. *pustulatus*, Kolbe, Stett. Ent. Zeit. 1895, p. 335.
Lake Tanganjika.

49. *reichei*, Waterh., *l. c.*, p. 369.
Abyssinia.

50. *rutilans*, Cast., *l. c.*, p. 71.
Sennaar.
51. *sericatus*, Erichs., Wiegm. Archiv. 1843, i. p. 232.
= *ducalis*, Dohrn. MS.
Angola.
52. *sericeifrons*, Fairm., Ann. Soc. Ent. Fr. (6) vii. p. 108.
E. Africa.
53. *signaticollis*, Waterh., *l c.*, p. 369.
Nubia.
54. *smaragdinus*, Boh., Ins. Caffr. ii. p. 187.
Caffraria.
55. *somaliensis*, Lansb., Revoils. Fa et Fl. Somali Land. Col. p. 15.
Somali Land.
56. *splendens*, Cast., *l. c.*, p. 71; Har., Col. Hefte viii. p. 4.
= *profanus*, Latr., Voy. Cailliaud. iv. p. 281.
= *splendidus*, Bertol., Nouv. Comment. Ac. Bonon. x. p. 393; Dej., Cat. p. 150.
= *virescens*, Walth. MS.
var. *wahlbergi*, Boh., Ins. Caffr. ii. p. 183.
var. oliviera, J., Sc. Lisb. ix. p. 40.
= *amœnus*, Reiche, MS.
Nubia; Sennaar; Fassoglu; Mozamb. Caffraria; Natal; Keren.
57. *subcupratus*, Boh., Ins. Caffr. ii. p. 184.
Limpopo.
58. *thalassinus*, Klug, Monatsb. Berl. Ac. 1855, p. 650; Peters, Reis. 1862. p. 216.
Tette.
59. *thelwalli*, Waterh., *l. c.* (6), v. p. 367.
Lake Nyassa.
60. *tristis*, Cast., *l. c.*, p. 72.
= *fuliginosus*, Dej. MS.
= *modestus*, Walth. MS.
= *plicatipennis*, Hope MS.
Senegal; Nubia.
61. *unicolor*, Boh., Ins. Caffr. ii. p. 182.
Gariep.
62. *umbrinus*, Gerst., Arch. f. Nat. xxxvii. p. 49; Van. d. Deckens' Reis. iii. pt. 2, pl. vii. f. 6.
Zanzibar.
63. *vanderkelleni*, Lansb., Notes Leyd. Mus. viii. p. 72.
West Africa.
64. *virens*, Erichs., Wiegm. Archiv. 1843, i. p. 231.
= *gibbosus*, Roth., Wiegm. Archiv. 1851, i. p. 123.
= *nitidus*, Dej., Cat. p. 151.
= *pumilus*, Reiche, Voy. Gal. Ab. 1850, t. 18, f. 10, p. 308.
Tigre; Congo; Abyssinia.

(To be continued.)

LEPIDOPTERA IN 1896.

Notes from the Chester District.

(Continued from vol. xxix. p. 216).

Lepidoptera. — In June, at Chester, *Timandra amataria*, *Phibalapteryx lignata* (both plentiful), *Cilix spinula*, *Hepialus humuli* vars. with primaries marked brown, *H. lupulinus* (one unicolorous without the white markings on primaries), *Melanippe montanata*, *Rumia luteolata* (*cratægata*), *M. sociata*, *Emmelesia decolorata*, *Cidaria dotata* (*pyraliata*), *Acidalia aversata*, *Hydrocampa nymphæata* with very dark forms, *Eurrhypara urticata*, *Hypena proboscidalis*, *Spilodes verticalis* (last four species about ponds and marshes), *Xanthosetia hamana* (by road-sides), *Xylophasia rurea* with var. *alopecurus*, *Phalera bucephala*, *Phlogophora meticulosa*, *Plusia chrysitis* with the banded form, *P. festucæ* (worn), *P. iota* (scarce) *P. pulchrina* var. *aureum* (one), *P. gamma* (very few this season), *Hadena oleracea*, *Apamea gemina* (variable as usual), *Hydræcia nictitans*, *A. oculea* (very variable). At Delamere Forest, on June 20th, *Cœnonympha typhon* (*davus*) (four specimens only—too late for the butterfly this hot season), *Bombyx quercus*, *Drepana falcataria*, *X. polyodon*. *Anarta myrtilli* was not so abundant as last season; specimens "dark reddish black" (see Catalogue of Lepidoptera of Ireland, Entom. xxix. p. 233), but with the white central spot on primaries clear and well developed; I took one, however, with this spot entirely absent. *Camptogramma bilineata*, *Ematurga atomaria* (dark vars., and a nearly black male), *Aspilates strigillaria* with very dark forms (not so abundant this season).

In July, at Chester, *H. oleracea*, *P. festucæ* (one), *P. chrysitis* (one of two specimens a banded form), *H. humuli* (one), a *C. spinula* on the 21st (second brood), *C. dotata* (*pyraliata*), *Larentia didymata* (large and very dark), *L. viridaria* (*pectinitaria*), *Epione apiciaria* (two worn males), *Rivula sericealis*, *Zanclognatha grisealis* (last two very local, by pond margins). At Delamere Forest, on the 23rd, *Cœnonympha pamphilus*, *Polyommatus phlæas*, *Lycæna icarus* (*alexis*) (all comparatively scarce). I was in London until August. From the tops of the West End omnibuses I frequently saw butterflies, dark and of the size of *Vanessa urticæ*; also a day-flying moth, probably *Orgyia antiqua*. A few very dusky forms of *C. pamphilus* seen on the bare, sunburnt fields between New Barnet and Hadley Wood.

On Aug. 6th, in North Wales, I never saw vegetation so poor, thin, and sun-dried; hardly a trace of the usual wealth of flowers, and very few insects. *L. didymata* with forms almost white to almost black, *Parage megæra* (one), *Pieris brassicæ* (common locally). On the 8th, at Delamere Forest, hardly any insects, *Hypsipetes elutata* (two), *Charæas graminis* (tawny and black-brown forms), *C. phlæas* (one). Near Chester, *V. io*, *P. rapæ*, *Noctua umbrosa*, *Coremia designata* (*propugnata*), *Cabera exanthemata*, *N. xanthographa* (reddish and black forms), *Paraponyx stratiotalis*, *E. apiciaria* (worn), second broods of *Liparis auriflua*, *C. spinula*, *P. lignata*. At gas-lamps moths were equally scarce—three specimens of *Eugonia erosaria* (*tiliaria*), one a female.

In September, at gas-lamps, *Neuronia popularis*, *Luperina testacea*, *L. cespitis* (all males), *Melanippe fluctuata*, *Cidaria russata* (two or three very small and poor examples of each).

In October, *Agriopis aprilina* (one, at rest on an oak just outside the city), *Oporabia dilutata.*

In November, at gas-lamps, *Hybernia defoliaria*, *Cheimatobia brumata*, *Pœcilocampa populi* (a few of each).

In December, *P. populi* (two, one at a gas-lamp, the other flew into a shop in the city).

LARVÆ AND PUPÆ.—Mr. Hargreaves gave me, on April 4th, a caterpillar of *Noctua brunnea* he had taken in Delamere Forest. The moth, a fine dark one, appeared on June 9th. In North Wales, larvæ of *Agrotis ashworthii*, in usual quantity. Out of two dozen or more I only got six moths—one a cripple—in June. This was similar bad luck to last year's. All *ashworthii* breeders, I fear, must lay themselves out for this, and be glad if they sometimes meet nothing worse. Mr. Hargreaves brought me seven larvæ of *Bombyx quercus* from the Lancashire sandhills, where he found *Nyssia zonaria* imagines. Six male and female *quercus* emerged from their cocoons in July, the first a male with the right lower wing entirely absent. Curiously enough I came across, in Delamere Forest, on July 11th, a *Vanessa urticæ* exactly in the same condition. It was a fresh specimen, and was able to get along so well with three wings that I failed to net it. In April and May larvæ of *Arctia caia* and *Odonestis potatoria* were unusually abundant around Chester. Of the first species I took at least two hundred caterpillars, in the hope of getting something startling as a "variety." As usual, I was disappointed. Still, there were some interesting forms. Sometimes the chocolate blotches nearly covered the primaries; sometimes the black spots were equally in the ascendant on the secondaries; but the most interesting feature was the difference in tint of the secondaries, from deep yellow with the barest suspicion of red in one example, to deepest crimson in another. These two (males) I added to my collection; the first has only four spots on each lower wing; the other has the secondaries well blotched with large and often confluent spots. Another specimen has the left secondary much more spotted than the right. Lastly, the ground colour of the primaries in some of the moths is a pure white, in others very ochreous. Many larvæ were ichneumoned; some succumbed in the second stage to a parasite which left them as if preserved; others, in the final stage, to a different species, which crawled in swarms out of the caterpillars as white maggots, and then spun tiny whitish cocoons. Frequently, after being disturbed by a companion, a larva would leave off spinning, take to the floor of the cage, and there change into a chrysalis. This had to be quickly removed, or it would be devoured by the remaining larvæ. I selected about forty of the moths for setting; the rest I took a mile or two into the country, in different directions, as they emerged. Had I not done so, some of them would have been brought to me by people offering them for sale. On April 6th I took a larva of *Spilosoma fuliginosa*, spinning up on the heather on the top of Moel Fammau. The moth appeared on May 6th, a fine male, and almost as dark as the var. *borealis*. On April 16th, eggs of Beeston Castle *Polia chi*, crossed by Durham *olivacea*, hatched. Fed up on groundsel. The larvæ did badly, many dying. Survivors pupated by June 20th. First emergence, August 10th. Imagines all *olivacea*, except two which were typical. Larvæ of *Xanthia cerago* unusually plentiful; a few *X. silago* and *X. ferruginea*. These were captured as they crept from the sallow catkins on which I fed *A. ashworthii*. On May 19th I took five pupæ of *P. festucæ* from *Glyceria aquatica*; also one on the 20th, and two on the 25th. The imagines appeared from May

31st to June 11th; pupæ of second brood scarce; took two, Aug. 14th; only one moth emerged, Aug. 30th. May 23th, *Amphidasys betularia* var. *doubledayaria*, from last year's pupæ. On May 24th I lost all my young larvæ of *Amphidasys strataria* (*prodromaria*) and *Tephrosia biundularia*, through not being able to attend to them. On June 8th some Delamere *Cabera pusaria* began emerging; I did not get the "black" form among the specimens. I found larvæ of *Hybernia marginaria* (*progemmaria*) to be combative and cannibal; they diminished in numbers daily. Larvæ of *Nyssia zonaria*, hatched May 7th and all pupated by July 15th, I found very combative, but not cannibal. In June *Smerinthus ocellatus*, *S. populi*, and *A. lucernea* appeared from last year's pupæ; also *Notodonta dromedarius*. July, *Lophopteryx camelina* (light and dark forms). Larvæ of last two species from Delamere Forest. July 23rd, larvæ of *Eupithecia pulchellata* common in foxglove flowers, Delamere Forest. *Anarta myrtilli* plentiful; picked two dozen in half an hour or so off the tops of the heather; their chequered pattern of green and yellow made them easily seen. Caterpillars of a sawfly also, on the heather tops, in plenty; head reddish, face black, rest of caterpillar (above and underneath) putty colour; a row of thirteen large, very black spots (one on each segment) along each side just above the pale, indistinct brown spiracles; below spiracles an almost continuous line of similar spots; there is also a medio-dorsal indistinct row of elongated black marks. Legs putty colour, spotted with the same intense black. The larva I wrote this description from I watched change its skin, through a lens, on July 24th. I was particularly struck with the delicate sense of touch exhibited by the six legs, which terminate in what looks like a miniature hand with one finger. This finger is most sensitive, and is composed of contractile tissue. Thus it can be extended, or contracted, or bent in on the palm for grasping purposes, and ends in a claw. The two front legs seem especially sensitive, a highly nervous movement or twitching being always visible. This caterpillar spun a close brown cocoon next day, very like that of *Eriogaster lanestris*, but a little smaller. Ichneumons on the wing unusually common. On Aug. 22nd I took a larva of *S. ocellatus* near Chester, off sallow; there had evidently been a considerable number at the place. There were several broods also of *P. bucephala*. The *S. ocellatus* pupated on Aug. 29th. Several larvæ of *Acherontia atropos* were found in the district about this time. From Oct 3rd to 17th *Bombyx rubi* caterpillars were abundant on a certain Delamere heath; I picked up a hundred full-grown ones, reserved fifty for myself, and divided the rest between a couple of friends. The object was to try the chip-box system for hybernation, each caterpillar being put into a separate box when full-fed at the end of October, and the boxes kept on a warm mantelpiece. The experiment, in each case, was a total failure. Three of my larvæ died in spinning up, and the rest before any attempt at spinning, by the end of December; two were ichneumoned, the parasite larvæ behaving as in the second case of *A. caia*. Ichneumon black, head also, antennæ long and robust. Legs brown-black. Ovipositor hardly visible through a lens, and without sheath. Upper wing with three contiguous areolets; first black, and rests on centre of costa; second and third stretch obliquely in direction of wing-base as far as the wing-centre; a nervure then proceeds from the third to the base of the wing. Four wings transparent, except costal black spot or first areolet. Many of the parasites emerged from their cocoons in December; the rest seem to be lying over the winter. The chip-box experiment included a few caterpillars

of *Nemeophila russula* and *S. fuliginosa* I took on the same heath. They all died. Three of the latter were almost black; the other four were of the usual foxy colour. I should be glad to have the names of the sawfly larvæ and of the ichneumons.

DRAGONFLIES.—Out of a total of thirty-seven British species, we have sixteen in the Chester district. I saw ten of these sixteen during the season. I append a list:—

Ischnura elegans. Chester. Plentiful from May 19th to June 27th. There was a second brood, few in number, Aug. 14th.

Agrion puella. Chester. Flying with *I. elegans.* Plentiful; May 19th to June 20th.

Enallagma cyathigerum. Chester and Delamere; June 20th to July 23rd.

Platetrum quadrimaculata. Delamere. Scarce this season; June 20th to August.

Leucorrhinia dubia. Delamere. Less in numbers than last summer; June 20th to July 11th.

Sympetrum scoticum. Delamere. Not so numerous either; July 11th to Oct. 3rd.

Æschna grandis. Common about Chester as usual; July 6th to end of August. I saw one hawking along a hedge, July 14th, at 9 p.m.; another on the 21st, at the same time. Netted the last one, and then let it go.

Æ. juncea. Delamere. Common from July 11th to about the end of August. Rather late in appearance. Inadult, July 11th; spots lavender colour; wings very perfect and beautiful, as if glazed with transparent varnish. Altogether it had a pale lavender appearance on the wing, exactly like the dragonfly I could not make out at Witherslack (Entom. xxvii. 307). I have now no doubt the latter was an immature *Æ. juncea.* This species I have seen on the wing at 7 p.m.

Lestes sponsa. Delamere. Unusually numerous from July 11th to almost the end of August.

Cordulegaster annulatus. A male, taken about the middle of August, in the railway yard at Arthog, near Barmouth, was brought to me Sept. 3rd.

My collection now only numbers twenty-six species; the remaining eleven, chiefly Fen and Rannoch species, appear difficult to get—J. ARKLE; Chester.

LEPIDOPTERA IN SUFFOLK.

The records of past years afford conclusive evidence that the county of Suffolk is eminently suited for the study of entomology, and this *résumé* of a year's work amongst the Lepidoptera, principally in the neighbourhood of Ipswich, though not perhaps including any insect of exceptional rarity, will, I think, prove the truth of the foregoing remark. Although my diary does not run to the extent of pages which it did in 1895, it must not be inferred that the season was less productive than its predecessor, for that result is partly attributable to the irregularity with which my entomological pursuits were conducted, owing to professional engagements, and partly to the miserable weather of the autumn. In collecting the Micros the time at my disposal was principally devoted to the consequent neglect of the Macros. Light I practically neglected, and I need only say that my anticipations in regard to it (Entom. xxix. 53) have been realized, the introduction of the incandescent gaslight having materially diminished the

number of visitants to the central electric arc lamps, which have been comparatively deserted, the decrease being especially noticeable in the case of the Sphingidæ, the Notodontidæ, and the Bombycina generally.

The earlier months of the year were marked by extraordinary mildness —a great contrast to the Icelandic severity of the winter of 1894–5—and as a consequence the Hybernidæ and other harbingers of spring were out fully a month earlier, but by no means so plentiful; and this suggests the question whether a sharp winter is conducive to an abundance of Lepidoptera, or otherwise, to which I am induced to reply in the affirmative. Nothing of note was taken in January and February, but towards the end of March, Bentley Wood—the local collectors' "happy hunting-ground"—was frequented by *Diurnea fagella* and *Tortricodes hyemana*, amongst the former being many melanic forms, which I fancy increase yearly. Several *Brephos parthenias* were on the wing, and *Nyssia hispidaria* and *Cymatophora flavicornis* occurred, but my visits to the wood were made at a wrong time to reward my search. Hybernated specimens of *Dictyopteryx contaminana*, *Depressaria applana*, and *D. umbellana* were met with, the latter, which was newly added to the "Suffolk List of Lepidoptera" last year, being fairly common, and in good condition, on Rushmere Heath. Here I expected to find larvæ of *Bombyx rubi*, but only one was discovered, and that unfortunately had fallen a victim to the tread of the golfer, who bids fair to exterminate many of our heath-frequenting insects. The list for the month was concluded by two beautiful specimens of *Alucita polydactyla* and *Tæniocampa munda*, at electric light. The Tæniocampidæ, I might say, were left to their nightly refection at the sallows unmolested, but the genus was very poorly represented elsewhere, for I only saw a few *T. instabilis*, and not one *T. gothica*. *T. gracilis* visited light in April, with a good-conditioned *Gonoptera libatrix*.

May was an ideal month for the lepidopterist, and Micro-collecting was pursued with advantage, especially towards the close of the afternoons, when the hedgerows abounded with the ubiquitous *Symæthis fabriciana* and *Swammerdammia pyrella*, others not so common being *Dicrorampha* (*Endopisa*) *saturnana* (one with one fore wing darker than the other), *Harpella geoffrella*, *Tinea cloacella*, *Elachista rufocinerea*, *Lithocolletis scopariella*, *L. sylvella*, and doubtful specimens of *Ornix anglicella* and *Bucculatrix boyerella*. A fine newly-emerged *Smerinthus tiliæ* was taken at rest on a wall. The genus *Depressaria* was represented by solitary examples of *arenella* and *alstrœmeriana*, and it is noteworthy that whereas in 1893 these could be freely netted at dusk along the hedgerows, they have since been scarce. Visiting the wood on May 30th, I found the localised *Tephrosia punctulata* (which exhibited considerable variation) swarming on tree-trunks, which also yielded three specimens of *Lobophora hexapterata*, together with several *Cidaria corylata*, the skittish *Ephyra pendularia*, and *Scoparia ambigualis* (which swarmed). *Macaria notata* and *Drepana falcula* were on the wing, evidently just emerged, other Macros being *Fidonia piniaria* (common), *Strenia clathrata*, *Asthena candidata*. *Herminia barbalis*, *Acidalia remutata*, and *Panagra petraria*, a pest to the wood in 1895, were appreciably fewer in number. In addition to *Lobesia reliquana*, *Argyresthia conjugella*, and *Bucculatrix ulmella* (all new to Suffolk), I boxed the following Tortrices:—*Tortrix ministrana*, *Sericoris lacunana*, *S. urticana*, *Roxana arcuana* (all more or less common), and these Tineæ:—*Tinea rusticella*, *Micropteryx sparmannella*, *Adela viridella*, *Gracilaria swederella*, *Coleophora anatipennella*, *Tischeria complanella*,

Lithocolletis ulmifoliella, and *L. quercifoliella* (common, but not previously recorded for the county). The tenacious larvæ of *Pœcilocampa populi* and *Agriopis aprilina* were found in the crevices of oak-trunks, and were afterwards successfully reared. In the town two *Amphidasys betularia* were taken in cop. from palings, and the var. *doubledayaria* came to light, with others, including *Sphinx ligustri*, *Smerinthus populi*, *S. ocellatus*, *Cerura vinula* (female), *Pygæra bucephala*, *Thera variata*, *Eupithecia centaureata*, *Crambus chrysonuchellus*, *C. pratellus*, and *Cemiostoma laburnella* (common).

The summer was characterized by great heat and unusual dryness, but notwithstanding the woods retained their luxuriant leafage until late in the year, a contrast to the summer of 1895, when the bushes were simply bereft of their foliage through the ravages of the larvæ of the Hybernidæ, *Cheimatobia brumata*, *Phigalia pilosaria*, and other autumn and spring insects, to the detriment of day-collecting. June 9th was a gloriously fine day, and I was induced to visit Bentley Wood. On the route I detected, on palings, *Sciaphila subjectana*, *Lobesia reliquana* (female), *Micropteryx seppella*, and *Nepticula subbimaculella*, and, arrived at my destination, I encountered *Euclidia mi*, *Venilia maculata*, *Macaria notata* (three), *Emmelesia affinitata*, and *Eupithecia plumbeolata*; whilst on trunks I boxed two *Nola confusalis* (*cristulalis*), *Acronycta rumicis*, and a long series of *Gelechia proximella*, with one or two of its prettier congener, *G. luculella*. Other Micros disturbed by the beating-stick were *Crambus geniculeus*, *Argyrotoxa conwayana*, *Ptycholoma lecheana*, *Spilonota rosæcolana*, *Halonota cirsiana*, *Capua ochraceana*, *Phoxopteryx lactana* (*Anchylopera ramella*), and *Swammerdamia cæsiella* = *spiniella* (new to Suffolk). In the fir-wood *Coccyx tædella* (*hyrciniana*) was netted, and *Coleophora laricella* was shaken from its food-plant. On June 14th, in the same collecting-ground, I added *Ephyra punctaria*, *Phibalapteryx vitalbata*, another *Argyresthia conjugella* (mountain-ash is spread well over the wood), and *Adela degeerella*. A favourite haunt in the suburbs of the town, in which clematis grows freely, was visited on June 2nd, and by dusking I secured *Ephipphiphora brunnichiana* (new to Suffolk), and a curious dark example of *Tinea rusticella*, with unusually broad fore wings, other captures being *Asthena luteata*, *Ligdia adustata*, *Melanippe procellata* (abundant), *Cidaria russata*, *Pyralis costalis*, *Penthina pruniana*, *Sciaphila virgaureana*, *Plutella cruciferarum*, *Elachista cygnipennella*, *Lithocolletis messaniella*; and, on palings, *Nepticula ? aurella*. At Bramford, on the 12th, over a small plot of yarrow, I caught *Conchylis straminea*, several *Dicrorampha petiverella*, and one *D. plumbana*; and when at Campsey Ashe, on the 23rd, two *Catoptria juliana*, *Sciaphila hybridana*, and *Argyresthia nitidella* were taken from elm-trunks. Captures at light in town during the month included *Orgyia pudibunda*, *Leucania comma*, *Phibalapteryx vitalbata*, *Pyralis farinalis*, *P. glaucinalis*, *Aglossa pinguinalis*, *Eudorea cembræ* (three), *Tortrix podana*, *T. heparana*, *T. unifasciana*, *T. viridana*, and *Depressaria heracliana*; whilst by other means I obtained *Mamestra anceps*, *Coremia quadrifasciaria*, *Cidaria fulvata*, *Cataclysta lemnata*, *Spilonota ocellana*, *Sciaphila nubilana*, *S. pascuana*, *Gelechia affinis*, and *G. vulgella*. A feature of the month and of the year was the extraordinary prevalence of clothes-moths, which were extremely destructive. My house was infested with *Tinea biselliella* (I had never seen it before), and I must have exterminated no fewer than 500 on their first emergence—the first few days of the month. Their breeding place I discovered in a disused mattress, and I found they could easily be reared. *Endrosis fenestrella*, of course, were

numerous, and in evidence every morning in the milk-jug, and *Ephestia elutella* abounded; *Œcophora pseudo-spretella* and *Œ. fuscescens* occurred with less frequency. I may conclude these notes on the month by mentioning those Micros obtained by careful scrutiny of wall-ledges (a means of collecting which I recommend the adoption of):—*Batodes angustiorana* (two), *Depressaria costosa*, *Gelechia fugitivella* (these swarmed on elm-trunks), *Argyresthia gœdartella*, and *A. brochella* (several).

During July, among the visitants to light was an aberrant *Tortrix*. Mr. C. G. Barrett has seen the specimen, and considers it to be undoubtedly a variety, and, as its fore wings do not agree with *T. heparana*, has named it as probably *T. ribeana*. Other captures were *Odonestis potatoria*, *Plusia iota*, *Eupithecia coronata*, *E. sobrinata*, *Scoparia pallida*, *Crambus inquinatellus*, *Dictyopteryx læflingiana*, &c. A fine variety of *Abraxas grossulariata*, with the fore wings from the centre to the costal tip completely black, was brought me by a friend; *Tinea ferruginella* was taken in a railway carriage whilst on the way to Felixstowe, and *Grapholita penkleriana*, *Steganoptycha nævana*, *Pædisca corticana*, *Tinea fuscipunctella*, *Hyponomeuta padellus*, *Prays curtisellus*, and var. *rustica* were found under wall-ledges. By beating at Blakenham, on the 8th, I collected *Acidalia emarginata*, *Eubolia mensuraria*, *Paraponyx stratiotalis*, *Hydrocampa stagnata*, *Ebulea crocealis*, *E. sambucalis*, and *Peronea variegana*; and by the same process at Akenham, on the 18th, *Iodis vernaria*, *Melanippe subtristata*, *Hydrocampa nymphæata*, *Crœsia forskaleana* (dark-blotched variety); and the following in or around the town:—*Cilix spinula*, *Eupithecia succenturiata*, *Tortrix rosana*, *T. xylosteana*, *Crœsia holmiana*, *Spilonota ocellana*, *Sphaleroptera ictericana*, *Carpocapsa pomonella*, and *Phibalocera quercana*.

An almost unprecedently dry summer had its reverse in a long spell of wet, cold weather, commencing from the latter end of August, and to this must be attributed the great falling off in insects. Those for August were mostly attracted to light, viz. *Hepialus hectus*, *Notodonta camelina*, *Catocala nupta*, *Noctua plecta*, *Cosmia affinis*, *Crocallis elinguaria*, *Ephyra omicronaria*, *Acidalia promutata*, *Aspilates gilvaria*, *Eupithecia subfulvata*, *E. assimilata*, *Pelurga comitata*, and *Hyponomeuta cagnagellus*. The "Thorns" were conspicuous by their absence—I did not secure any *Ennomos fuscantaria*, which was taken in considerable numbers in 1895; whilst *E. tiliaria*, usually a frequent visitor to the street-lamps, was only seen once. One *Xanthia citrago*, just emerged, was taken from palings on the 29th. From August my diary became almost a blank, and I have only to mention *Xylina rhizolitha*, *Hybernia aurantiaria*, and *Gelechia domestica* to conclude the year's record. I am indebted to the Rev. E. N. Bloomfield, and, through him, Mr. C. G. Barrett, for kind assistance in identifying the Micros.—CLAUDE A. PYETT; Waterloo Road, Ipswich, December, 1896.

NOTES FROM THE EASTERN COUNTIES.

Last season was a phenomenally early one; the sallows were out a fortnight before their usual time, and moths were plentiful. In the first week in April I went to Hunstanton, but caught nothing specially noteworthy; the larvæ of *Antithesia variegana*, *Gelechia vulgella*, &c., were feeding on hawthorn, but were smaller than they were at Cambridge the preceding week. Subsequently I went down into the fens, and found the usual species out in plenty, and quite a fortnight earlier than their normal date.

In the last week in May I went to Epping Forest, where I obtained *Anticlea sinuata, Eupithecia virgaureata, Angerona prunaria, Melanthia ocellata, Acronycta aceris, Pyralis glaucinalis, Roxana arcuana*, &c., besides a good number of larvæ. the list of which is too long to give.

At Tuddenham, Suffolk, in July, I took *Ellopia fasciaria, Acidalia scutularia, A. osseata, A. ornata, A. aversata* var. *spoliata, A. emarginata, Emmelesia unifasciaria, Corycia punctata, Macaria liturata, Fidonia atomaria, Larentia miaria, Eupithecia linariata, E. lariciata, E. oblongata, E. succenturiata, Melanthia rubiginata* (banded form), *Melanippe rivata, M. unangulata, M. subtristata, Hypenodes costæstrigalis, Ennychia nigrata, Paraponyx stratiotalis, Pionea stramentalis, Crambus perlellus, C. falsellus, C. latistrius, Pœcilochroma ratzeburghiana, Retinia buoliana, Sericoris lacunana, Phibalocera quercana, Xanthosetia zœgana, Ochsenheimeria bisontella, Gelechia tæniolella, G. mulinella, G. dodecella, Aciptilia galactodactyla, A. tetradactyla*, and *Amblytilia acanthodactyla*, with other commoner species and several larvæ.—Albert H. Waters; Devonshire Road, Cambridge.

(To be continued.)

NOTES AND OBSERVATIONS.

The Christoph Collection.—I believe that this collection was sold intact, and that it is now in this country. Can anyone kindly inform me as to its present whereabouts?—R. South; 100, Ritherdon Road, Upper Tooting.

Platyptilia tesseradactyla, *L.*, in Ireland.—Mr. C. G. Barrett (Ent. Mo. Mag. xxxiii. 25) introduces this addition to the list of British plume-moths. Several specimens, sent to Mr. Barrett for identification, were taken by Mr. F. de Vismes Kane and the Hon. R. E. Dillon "in the first week in June, 1895, at Clonbrock, flying in the sunshine to the flowers of a species of *Gnaphalium* on a dry bank alongside a bog." Mr. Kane adds that a series was taken in 1894 by Mr. Dillon, but were supposed to be *zetterstedtii;* a single specimen has also been taken in another locality in Galway. The larva appears to feed on *Gnaphalium* in the flower-stem at first; and afterwards, in the spring, on the "larger young shoots." It will be remembered that the Noctua, *Calophasia platyptera*, discovered in this country last year, was also associated with *Gnaphalium*.

Apple-trees and Cheimatobia brumata.—For many years past part of my duties as head-gardener has been the care of fruit-trees. For a still longer period I have indulged in collecting moths, and *Cheimatobia brumata* flies at a season when I have most leisure for the work. I have collected in two or three different counties, and my observations have led me to infer that, at least in those localities, the male of the species in question does *not* carry up the female. After making frequent observations I have noticed that if the pairs are knocked lightly off the trees they fall to the ground; and when thrown into the air they do the same. If they are carried home in an open box they will not, while united, attempt to move or fly; but as soon as they part they begin to make off. The male flies to the female as she

ascends the tree, and joins with her usually at about three or four feet from the ground; the female does not turn when joined by the male, but remains still in an ascending position; and as long as they remain united the male has its head in the direction of the base of the tree. The disengaged males, which usually number ten to one of the others, rest on the trees in a normal position. This moth is abundant in Middlesex, exceedingly so here; and we regularly grease-band our apple-trees, the large numbers caught show with what results. In the 'Entomologist' for February, 1895, p. 59, Mr. Rowland Brown mentioned that in the previous December the water of the dyke was strewn with the dead bodies of the males, and this is a thing of annual occurrence.—Geo. Wall; Grim's Dyke, Harrow-Weald.

Tapinostola bondii.—Last week a landslip of the greensand, opposite "The Vicarage" here, shifted one end of the ground upon which *T. bondii* occurs; but fortunately the more inaccessible portions of the locality, which furnish the insect with its head-quarters, being well shored up by a strong stone wall, are in no present danger. It is curious to observe how excessively local and at the same time abundant the species is, or was, in its metropolis. For near on forty years men and boys have taken it by hundreds upon hundreds, and yet have not succeeded in eradicating it. The chief reasons for this concentration of the insect would seem to be that the best ground is difficult to work, and therefore never disturbed excepting in the *bondii* season; and that the food-plant (*Arrhenatherum avenaceum*) in the dry sandy soil grows rampant, and the tubers at the base of the stalks spread about, and thus afford an exuberance of nourishment (see Deakin, 'Florigraphia Britanica,' vol. i. p. 104); whereas there does not appear to be that tendency to such vigorous growth in clayey or chalky land. *Bondii*, so far as I am aware, has never been found on the chalk; but I have been told that a straggling specimen was once taken in "the warren" upon the gault.—H. G. Knaggs; Folkestone, Feb. 9th, 1897.

Forcing Acherontia atropos.—In a late number I wrote that I proposed to try again the "moist forcing" of some pupæ of *A. atropos*. I beg now to state the results. Two larvæ and eight pupæ were sent to me from Sept. 4th to 10th. I placed the eight pupæ on moss, in a pot kept damp, by the fireside. Of these two were found to be dead; very probably injured when found by the potato-diggers. One moth emerged Nov. 4th; Dec. 2nd, one; 7th, one. Both these last were "crippled," one slightly; the other did not appear to have power to dilate its wings. Jan. 1st, another emerged; and another on the 10th. Both these were very fine and perfect insects, and one still remains under treatment. The two larvæ which went down in pots are still in a cool greenhouse. I may see the perfect insect in May or June.—H. W. Livett; Wells, Somerset, Feb. 9th, 1897.

Acherontia atropos.—I have been fortunate enough to rear four imagines from an equal number of larvæ. The pupæ were damped and forced according to the advice which has been given in the magazines. The larvæ came into my hands in August and early September. Mr. Leech was kind enough to send me the two larvæ which he recorded (Entom. xxix. 366). All the larvæ pupated as soon as I got them, and they were left alone until the beginning of October. They

were then put into a greenhouse, the temperature of which was at a guess 60 or 70 degrees by day, and 50 or 60 degrees by night. Here they were watered, but without any regularity. The moths all emerged in November. Two of the pupæ were left in the earth, but I made it easy for the moths to escape by scraping away the soil until I broke open the top of the cocoon. The other two pupæ were placed among moss. Some trouble was taken to provide ladders, so that the freshly emerged moths would be able to climb up them and obtain a firm hold whilst the process of inflation of the wings was going on. One of the larvæ, when I received it in a box by post, should then have been underground. It had shrunk a good deal, and was quite unable to crawl. Instead of burying it in earth I just put it on a sheet of paper in the dark and it pupated all right. What interested me most about these insects was the seemingly unnecessarily large cocoon or cavity which they scooped out. This has been already referred to in your pages. The cavity looked quite capable of holding three pupæ easily instead of one. The interior is not smooth, but pitted all over with little indentations, which are, I suppose, the prints made by the feet of the larva, when it is enlarging the cavity by beating back the walls.—W. M. Christy; Watergate, Emsworth, Hants.

British Orthoptera.—Mr. M. Burr (*ante*, p. 28) mentions *Meconema varium*, Fab., being taken at sugar. Twice last season I took the same species by the same means: on Aug. 14th in the New Forest; and on Oct. 10th in Richmond Park. *Platycleis brachyptera* I have been accustomed to take in fair numbers in two localities near Esher, Surrey. Last season, however, it was apparently absent from one; the other I did not examine. One locality is by the side of a boggy pond; the other is on an open sandy spot. In both cases, however, the insect is taken on *Erica tetralix*, which grows luxuriantly in each place.—W. J. Lucas; 21, Knight's Park, Kingston-on-Thames, Feb. 10th, 1897.

High Flat-setting.—Mr. Warburg, in his plea for the adoption of flat setting on the ground that it would save him (and others) much trouble (*ante*, p. 45), appears to have lost sight of the immense amount of labour it would impose upon those who, as collectors of British Lepidoptera only, adopt the curved style. And not only this, what a number of our, in many cases, *best* specimens would suffer or be completely spoiled in the process, the "blues" for instance. On this ground alone we might well hesitate, however much we felt inclined to meet the wishes of foreign collectors; but, as I said before, we cannot all go in for foreign insects as well as our own, and we who have to rest content with the latter think it desirable to adhere to our present method of setting. Were we to admit continental types and series into our cabinets, which proceeding might or might *not* (probably the latter) prevent extermination of some of our species, it would be but the insertion of the thin end of the wedge that would surely eventually bring everything down to the continental level, a result greatly to be deplored. It would also, to my mind, greatly facilitate the palming off upon us by unscrupulous persons of continental or foreign specimens (common enough *there*) as British-taken rarities, a thing even now sometimes difficult to guard against. I would suggest that entomologists who set in the curved style, and

who yet are in the habit of exchanging with or supplying foreign collectors, should mount some of their spare insects flat for this purpose, and so save their correspondents the trouble of resetting them. With regard to Mr. Jacoby's remark (Entom. xxix. 359), referred to by Mr. Warburg, "the setting *alone* is no guarantee," I should have thought that this was a fact so obvious to everyone that it did not require mention; but I venture to say that a British rarity if *flat set* would of a surety be eyed askance even although it might have the necessary "label." Also this gentleman's reference to "mites" did not seem to me to be quite happy. Is he not aware that in most, if not all, good English collections the specimens are set well up on the pins, and the wings do *not* touch the paper, consequently the "beautiful chance" spoken of does not come in at all; besides in a carefully kept cabinet mites ought to be almost if not quite an unknown quantity.—E. Sabine; Erith, Feb. 2nd, 1897.

High-Flat Setting, &c.—The remarks of a correspondent respecting this subject (Entom. xxix. 330, 1896) amuse me considerably, as they apparently seem to exhibit the preponderating influence of the commercial instinct. If we all collected insects with the paramount idea that they were ultimately destined for Stevens's Auction Rooms, the study would be completely revolutionised. I consider your correspondent a typical specimen of the British entomologist, in the prejudiced opinion which he possesses respecting the mode of setting insects. Another matter I should like to mention is the erroneous way the majority of entomologists have, in this country, of pronouncing the scientific names of insects. This is the outcome again of our insular isolation. Foreign entomologists have a great difficulty at first in understanding the English on account of their way of pronouncing Latin names, which on the Continent are pronounced very differently. Our style is not the orthodox one, and should most certainly give way to that in use on the Continent, both in countries where the Latin and the Teutonic elements prevail. Although I am pleased to see more persons in this country are taking an interest in foreign insects every year in proportion to what formally prevailed, it is "nothing but insular prejudice" perhaps which prevents many extending their interest, at least, to the European, of which the British Fauna, as the late H. W. Bates once said, constitutes only "a half-starved fragment." There is thus such little intercourse between British entomologists and their *confrères* abroad, that the opinion prevails generally in France and Germany that there are very few students of the science, in comparison, in this country.—W. Harcourt-Bath; Birmingham.

Uniformity in Pinning and Setting Lepidoptera.—Now that this subject has been brought forward, I hope it will not be allowed to drop until a satisfactory settlement has been arrived at if possible. Mr. Tunstall's suggestion (Entom. xxix. 299) to adopt standard sizes of pins is an excellent one, but I think it would not remedy the evil, for I consider that the setting-boards are quite as much in fault, if not more so. From my own experience I find that the setting-boards plied by dealers are most unsatisfactory. The grooves are very not deep or wide enough to set the insects well; a board that is

enough for the wings is often too narrow in the groove to set the insect well up to the shoulder. I find it much better and cheaper to make my own boards. If we are to have standard pins, then let us also have standard setting-boards, the grooves of which shall be of a recognised width and depth. These boards should be numbered to correspond with the numbers of the pins. Thus, an insect that requires board No. 1 would have to be pinned with pin No. 1. A far better plan, however, would be to have pins all the same length, but of various degrees of thickness, to which the numbers would then refer. All sizes of boards should have the same depth of groove, and therefore all the insects would be the same height on the pin. The only objection to this plan would be that the smaller insects would appear to be set on the continental system, but by adopting a medium height for the larger ones, this would not perhaps be a serious drawback.—EDWARD RANSOM; Sudbury, Suffolk, Jan. 1897.

VARIATION IN THE COLOUR OF ACANTHOSOMA HÆMORRHOIDALE.—I have in my collection four specimens of this insect. One of them, captured on June 14th, 1892, was especially bright green in those parts which are usually green; the second, taken on Sept. 3rd, 1893, was green, but a much duller green; the third, taken on Oct. 28th, 1894, had the green parts a yellowy ochreous colour; the fourth, taken on Nov. 18th, 1894, had the same parts of a deep autumnal red colour. Hemipterists who have had more experience with this insect than I have will know whether this change of colour is typical for the different times of year. If it is so, it seems to me to be worth calling attention to, as the change in colour of the insect coincides with the change in colour of the leaves at the different times of year, which would be a great protection to it. —R. M. LEAKE; 15, Alleyn Park, S.E.

"SHOULD THE FORMATION AND ARRANGEMENT OF A COLLECTION OF INSECTS BE MADE SUBSERVIENT TO THE ELUCIDATION OF SCIENTIFIC PROBLEMS?"—Commenting on this and other papers by Mr. W. Harcourt-Bath (Entom. xxix.), our contemporary, 'Natural Science,' in its February issue, says:—"The general question raised by Mr. Harcourt-Bath is of such wide and practical interest that we hope room may be found for further discussion of it. It is clear that specimens of any kind arranged in some logical order are more likely to elucidate problems than those arranged on no scientific plan; moreover, the superiority of specimens to elaborate descriptions, even to tabulated statements, is apparent at a glance. Evidence of the value of Mr. Bath's method is afforded by his paper 'On the Vertical Distribution and Derivation of the Rhopalocera in the Pyrenees.' Of course each individual collector will have his own predilections, problems, and arrangement; the more diverse their points of view the better."

LEUCANIA UNIPUNCTATA MIGRATING.—We learn from 'Psyche,' the organ of the Cambridge (Mass.) Entomological Club, that there were swarms of this moth last summer on the coast of New Hampshire; walls and ceilings of sleeping-rooms in some houses were so covered "that the rooms could not be occupied until the moths had been cleared out. In at least one case the rooms had to be fumigated with sulphur, and the dead moths swept up and carried away." Fishermen *reported "a great* cloud of the moths over their boat out on the sea."

ABERRATIONS OF LEPIDOPTERA CAPTURED IN 1896.—The first part of the summer 1896, from the middle of May up to July 25th, was quite exceptional with us, on account of the great heat and the large number of Lepidoptera it brought with it. Among the Lepidoptera captured the following three aberrations are most interesting.

The first variety is that of *Catocala nupta*. The second half of July was very remarkable for the extraordinary numbers of specimens of the genus *Catocala*. For many consecutive evenings the sugar-patches were literally covered with them: *C. fraxini* and *C. nupta*, as usual, were predominant; *C. adultera* and *C. pacta* were in fair numbers; *C. sponsa*, rarer, but also plentiful; and only *C. promissa* and *C. paranympha* were very rare. After the first evenings, in fact, these great moths became a nuisance, as they most unceremoniously pushed the other moths off the trees. Owing to their numbers a great many living specimens of *Catocala* could be inspected and compared with each other. On the whole, no marked difference existed between the examples of each species, only the primaries having a more or less distinct pattern, being more or less brilliantly coloured; the secondaries are always the same in form, except in the case of *C. nupta*, which has sometimes a broader or narrower black band. One of the specimens, however, showed exceptional aberration. Upper surface: fore wings show the usual margin, but all the other spots and lines, characteristic of *C. nupta*, are wanting; the wings are of a uniform greyish-brown tinge; the central dark spot is seen, and beneath it there is a large white one, corresponding in position with the white spot on the primaries of *C. fraxini*. The secondaries are of a peculiar red, considerably paler than usual, and having some pink colour in its composition; the black median band is wanting, and its position is only indicated by a series of grey marks and three short lines. The black border is rather narrower than in typical specimens. Taken at sugar, July 25th.

The second variety is a male *Argynnis selene*. This example was captured on the 26th of July, evidently an individual of the second brood; the first brood was on the wing this year from May 19th to the middle of June. The upper surface of the wings of this aberration is peculiar, as with the exception of a submarginal series of minute dots and the fine marginal lunules the black markings are confined to the basal half of each wing; the number of the marks themselves is eight on the fore wing and two on the hind wing. Of the eight spots on the fore wing not one occupies its normal place; all are either longer or larger than in typical specimens. The hind wings have only two marks: one is the usual round basal spot, characteristic of *A. selene;* the other, just beyond it, is in shape like the Greek letter Σ. The under surface of the wings is much paler than in the type; the black spots of the submarginal area are hardly seen, and the central band of the hind wing, consisting usually of alternately yellow and white spots, is wholly white with a silvery sheen. These differences, I believe, are due to the length of time that each specimen has lived; the less distinct marks and more uniform colour denote the older moths. The disastrous influence of daylight on the colours of moths is well known. I have seen a

collection of Lepidoptera in a case with a glass lid, which stood in a well-lighted room for some ten years: the diurnal Lepidoptera were but little changed, but the nocturnal ones showed a complete absence of colour; the marks, which could still be distinguished, were in different shades of grey; even the blue of *C. fraxini* and the red of *C. nupta* had turned to a whitish grey.

The third specimen to be referred to is a female *Polyommatus hippothoë*, ab. This is a cripple; on each side alternately one of the wings is fully developed, and the other deformed. The upper surface shows on the two fully-developed wings no marked differences from normal *Polyommatus*, except that it is rather less red. The undersized wings are of a uniformly dark brown colour, without any marks at all. The under surface is of a greyish colour, the orange being only in the middle of the fully-developed wings. Of these last the fore wing has almost the normal number of spots; those on the submarginal series are elongated, the first two especially so; hind wing with fewer spots, first two of submarginal series elongated, and there is much red on the marginal area. The two small wings: fore wing has only one spot in the centre, all the others are obliterated, and only faint indications remain of the submarginal series; hind wing has only two distinct spots on the submarginal area; these are very elongated, and there are some further spots on the marginal and submarginal areas to be faintly traced; the basal spots are distinct.

In conclusion I wish to add that this summer the varieties were unusually plentiful: thus for instance *Helotropha fibrosa* and *Angerona corylaria* were much oftener met with than the types *H. leucostigma* and *A. prunaria*. All the above-described aberrations were captured near Lauga, Govt. of St. Petersburg.—B. N. Menshootkin; Chemical Laboratory, St. Petersburg University.

CAPTURES AND FIELD REPORTS.

Leucania extranea, *Gn.*, in the County of Cork.—A small example, only 1½ in. in expanse, was taken near Timoleague, on the coast of Cork, at sugar on a railway post, in September last, by Mr. R. J. F. Donovan. He sent it to me for identification, correctly named from Newman, but wished to make sure of its identity, as he is only a beginner. The specimen is in tolerable condition, and there can be no question as to the species. This is the second Irish capture; the other is in the cabinet of the Hon. R. E. Dillon, and was taken in the same month at Clonbrock, Co. Galway, which is some thirty miles inland from the sea, whereas Timoleague is on the Cork coast. It would therefore appear that the insect is indigenous here, though possibly originally introduced from America by ships. The species has not been taken on the European continent, and in Staudinger's Catalogue "Mad; Angl. m. (advena?)" is given, which suggests a doubt as to the identity of Mr. Bond's specimen from Freshwater in September, 1859, an untenable supposition. Mr. R. Donovan's brother, Dr. C. Donovan, collected Lepidoptera assiduously near Glandore, Co. Cork, before he went abroad, and rendered me much valuable help in studying the distribution of Lepidoptera in that district of the county. It is to be hoped

that his work may be worthily supplemented by his younger brother, who has added such an important item to our knowledge of the range of this rare species.—W. F. DE V. KANE.

LYCÆNA BELLARGUS AND L. CORYDON IN 1896.—The year 1896 was a great year for *Lycæna bellargus* and *L. corydon* in the two localities in N. Wilts which I visited for them, on the look-out for varieties. A sloping bank of waste field at Winsley, about an acre in extent, where *Hipocrepis comosa* grows in plenty, was thickly studded with *L. bellargus* fanning its wings in the sunshine, or towards evening resting with closed wings on the grass-stems. The May brood was the most abundant; but out of the two broods in May and July I only took one good variety, which was an under side of the female with no spots except the central discoidal spot on each wing, and the hind marginal row of spots. Then early in August I paid two or three visits to the range of chalk downs extending east from Devizes, where I found *L. corydon* literally swarming; you could hardly walk without treading on a specimen, and along the base of the downs every flower of thistle and centaury had its two or three occupants. But, beyond the difference in the width of the black hind-marginal band, I did not notice any marked variation in the male, with the exception of one with the hind-marginal band white with black veins running through to the fringe. I also caught one dwarfed specimen with broad and rounded wings, looking quite a different species. I noticed that several males had a distinct black discoidal spot on the fore wings. Of the females I saw none of the form much mottled with white, such as I have found in Hampshire; but I caught nine of the blue variety (var. *syngrapha*), and saw as many more worn specimens. I was pleased to take this brilliant variety again. I first caught it in 1870, and then again in 1872, at which time I was living in the neighbourhood. After I left I paid several visits in later years, but I never saw another specimen till last year. Of the under side of *L. corydon* the only variation, beyond the enlargement of the spots, was the occasional absence of the basal spots of the fore wings, corresponding to var. *icarinus* of *L. icarus*. I have further to note that at Winsley, which is on the free-stone, I saw one male *L. corydon* last year along with the *L. bellargus*, which is the only specimen I have seen there, except one other male which I saw in 1893 in the same district, but not at the same spot. I should be glad if any entomologist in the Bath district would say whether there is any *L. corydon* locality near there. Also I saw three male *L. bellargus* amongst the *L. corydon* near Devizes. I have never seen a specimen there before, though I lived there many years; but there must be a *L. bellargus* colony somewhere near, from which these specimens were stragglers. What most astonished me in these trips was that amongst such a prodigious number of specimens—and of *L. corydon* I must have seen thousands and examined hundreds—there should be so little variation from the type.—C. A. SLADEN; Burton Vicarage, Neston, Chester, Feb. 2nd, 1897.

SETINA IRRORELLA IN SUTHERLAND.—Last June I found a specimen of this insect floating in a pool of water on a small island in Badcall Bay, on the west coast of Scotland.—HERBERT ASHBY; Pinehurst, Bassett, Southampton, Feb. 9th, 1897.

NOTES FROM NORTH WALES.—On May 28th and June 3rd, 1896, I took here at light three specimens (males) of *Agrotis cinerea*. Is not this generally considered to be a maritime insect? We are nearly forty

miles from the coast here. I may add that *Vanessa c-album* occurs very sparingly in this part of Montgomeryshire.—ALFRED S. TETLEY; Llwynon-Newtown, N. Wales, Feb. 9th, 1897.

LEPIDOPTERA OF THE SCILLY ISLES.—I am going down to the Scilly Isles at Easter, and should be glad of any information regarding the Lepidoptera of the islands. I am only a beginner, so any information through the 'Entomologist' would be thankfully received.—W. HUNT; 2, 4 & 6, Albert Bridge, Manchester, Feb. 13th, 1897.

COLEOPTERA IN JANUARY.—The weather during the early part of January having been exceptionally mild, my brother and I have been busily engaged in collecting Coleoptera, principally by cutting grass tufts and examining bark of trees. We have during the first fortnight taken abont 150 species, among the more interesting of which are:—*Dyschirius globosus* (common), *Harpalus latus*, *Metabletus obscuroguttatus*, *Falagria sulcata* (common), *Conurus pubescens*, *Quedius maurorufus*, *Lathrobium longulum*, *Stilicus orbiculatus*, *Stenus pubescens*, *S. picipennis*, *S. latifrons*, *Phlœobium clypeatum*, *Pselaphus heisei* (one), *Tychus niger*, *Bryaxis fossulata*, *B. juncorum* (not uncommon), *Scydmænus collaris*, *S. scutellaris*, *Choleva morio*, *C. tristis*, *C. sericea*, *Parnus auriculatus*, *Lema cyanella* *Chrysomela varians*, *Cassida obsoleta*, *Apion difforme*, *Hypera polygoni*, *Liosoma ovatulum*, *Bagous alismatis*, *Tychias picirostris*, *Rhinoncus castor*, *Balaninus brassicæ*, *Ocalea badia*, *Hygronoma dimidiata*, *Othius melanocephalus*, *Corticaria fuscula*, *Psylliodes picina*, *Ocypus cupreus*, *O. fuscatus*, *Achenium depressum*, *Anthonomus ulmi*, *Ceuthorrhynchus litura*, *Ceuthorrynchidius floralis*, *Homalium iopterum*, *Leptusa ruficollis*. *Cassida oblonga*, *Rhizophagus bipustulatus*.—BERNARD S. HARWOOD; Brooklyn Villas, Colchester.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*January 20th*, 1897. *The Sixty-fourth Annual Meeting.*—Professor Raphael Meldola, F.R.S., President, in the chair. An abstract of the Treasurer's accounts, showing a balance in the Society's favour, having been read by one of the Auditors, the Secretary, Mr. H. Goss, read the Report of the Council. It was then announced that the following gentlemen had been elected as Officers and Council for 1897: President, Mr. Roland Trimen, F.R.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Walter F. H. Blandford and Mr. Frederic Merrifield; Librarian, Mr. George C. Champion; and as other Members of the Council, the Rev. Canon Fowler, Mr. Herbert Goss, Sir George F. Hampson, Bart., Herr Martin Jacoby, Prof. Raphael Meldola, F.R.S., Mr. Osbert Salvin, F.R.S., Mr. James W. Tutt, and Mr. G. H. Verrall. The President then delivered an Address, and took for the subject, "The Utility of Specific Characters from the Point of View of the Darwinian Theory." His remarks had reference to the paper on this subject, read last June before the Linnean Society, by Dr. A. R. Wallace, and the subsequent discussion. Prof. Meldola pointed out that the question of "utility," as necessitated by the theory of natural selection, had hitherto been made to depend too exclusively

upon external and visibly manifest utility, a restriction which he did not believe to be warranted by facts. He argued in favour of a connection of the nature of correlation between apparently trivial external characters and latent physiological characters of great importance to the welfare of the species. From this point of view it was contended that the diagnostic characters used for purposes of description did not truly represent the sum total of the characters which must be regarded as specific. The President concluded by referring to the losses by death during the year of several Fellows of the Society and other entomologists, special mention being made of Mr. A. S. Olliff, Mr. Edward Armitage, R.A., Mr. Peter Inchbald, Miss G. E. Ormerod, Mons. Auguste Sallé, Mr. Arthur Dowsett, Herr Julius Flohr, Mr. J. Chappell, and Dr. Morawitz. A vote of thanks to the President was proposed by Lord Walsingham, F.R.S., seconded by Mr. Osbert Salvin, F.R.S., and carried. A vote of thanks to the Officers was then proposed by Prof. Poulton, F.R.S., seconded by Mr. R. Trimen, F.R.S., and carried. Prof. Meldola, Mr. McLachlan, and Mr. Goss replied, and the proceedings terminated.—H. Goss, *Hon. Secretary.*

February 3rd.—Mr. Roland Trimen, F.R.S., President, in the chair. The President briefly returned thanks for the honour conferred upon him by his election, and announced that he had appointed as Vice-Presidents, The Rev. Canon Fowler, M.A., F.L.S., Mr. R. McLachlan, F.R.S., and Professor Meldola, F.R.S. Mr. F. Bates, of 417, High Road, Chiswick; Mr. Dudley d'Auvergne Wright, M.R.C.S., L.R.C.P., of 55, Queen Anne Street, W.; and Mrs. E. Brightwen, of The Grove, Great Stanmore, were elected Fellows of the Society. Mr. Champion exhibited an extensive series of Coleoptera collected by Mr. R. W. Lloyd and himself in July last in the Austrian Tyrol, and containing about 450 species, including thirty-five of Longicornia and about twenty of Otiorrhynchus (the most characteristic beetles in the places visited). He also exhibited about eighty-five species of Coleoptera from Cintra, Portugal, collected by Col. Yerbury during the early spring of 1896, the most interesting of these being *Carabus lusitanicus*, F. Also, on behalf of Mr. W. H. Harwood, two specimens of the rare *Zeugophora flavicollis*, Marsh., from Colchester. Mr. Tutt exhibited, for Mr. H. B. Prince, some Lepidoptera, chiefly Noctuæ, from the Cheshire coast, to show the colour varieties there prevalent. Also, on behalf of Mr. W. H. B. Fletcher, some typical specimens of *Zygæna ochsenheimeri*, Zell., from Piedmont, and some hybrid Zygænids, obtained by crossing *Z. ochsenheimeri* male with *Z. filipendulæ* female. The hybrids were fertile *inter se*, the males of the cross exhibiting very markedly the characters of the male of *Z. ochsenheimeri*; whilst, on the other hand, the females, with two exceptions, strikingly resembled *Z. filipendulæ*. Mr. Tutt also showed, for Mr. J. B. Hodgkinson, a number of obscure British Micro-Lepidoptera, many of which had been regarded as new species. The validity of the determinations was discussed by Lord Walsingham, Mr. B. A. Bower, and others; and the first-named speaker strongly deprecated the practice of positively recognizing or describing such obscure forms, particularly when British, from single or worn specimens. A suffused aberration of a Gelechiid, taken at Witherslack, and described under the name of *Lita intermediella* (Ent. Rec. ix. 36) was referred to *L. fraternella*. Mr.

Barrett showed specimens of the true *Platyptilia tesseradactyla*, L. (=*P. fischeri*, Zell.) new to the United Kingdom, and taken in Co. Galway by Mr. W. F. de V. Kane and the Hon. R. E. Dillon. Mr. McLachlan exhibited cooked locusts (*Schistocerca peregrina*) received from the Rev. A. E. Eaton, and sold in the market of Biskra, Algeria, under the name of "Jarâd." They were cooked whole, but the abdomen only was eaten. A paper was communicated by Dr. A. G. Butler, F.L.S., on "Seasonal Dimorphism in African Butterflies," which led to a long discussion, chiefly on the so-called "dry-season" and "wet-season" forms. Mr. Merrifield stated that he had been unable experimentally to modify the colour and markings of Lepidoptera by variations in humidity. Mr. Tutt believed that Mr. Doherty had obtained "wet-season forms" of Oriental species by keeping the pupæ in a moist atmosphere.

February 17*th*.—Mr. R. McLachlan, F.R.S., Vice-President and Treasurer, in the chair. Messrs. Champion and Jacoby exhibited the collection of Phytophagous Coleoptera made by Mr. H. H. Smith in Grenada and the Grenadines for the West India Exploration Committee of the Royal Society. Mr. F. C. Adams exhibited rare Diptera taken in the New Forest during the preceding year, and including *Callicera ænea* and *Nephrocerus flavicornis*. Mr. M. Burr showed an example of an undetermined species of locust taken in the Post Office at Bedford Street, Strand, and six new species of Acrydiidæ of different genera. The Secretary exhibited a Cicada larva from which a fungus, probably *Cordyceps sobolifera*, was growing, which had been sent to the Society from Venezuela, with an enquiry as to its real nature. The Rev. Dr. Walker showed a series of Coleoptera, Hymenoptera, and Diptera, collected in the Orkney Islands during the previous season. Mr. Tutt exhibited bred examples of the extreme radiate variety of *Spilosoma lubricipeda*. This variety occurred naturally in Heligoland, and its existence in Great Britain was probably attributable to accidental importation. Mr. Jacoby and Mr. Champion communicated a "List of the Phytophagous Coleoptera obtained by Mr. H. H. Smith in St. Vincent, Grenada, and the Grenadines, with descriptions of new species."—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*December* 10*th*, 1896.—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. Brooks exhibited a very long series of *Acherontia atropos*, bred from pupæ obtained at Long Sutton this year. One specimen was much lighter on one side than on the other; it was suggested that a deficiency of fluid in the wings through injury was the cause. He also exhibited a very long series of *Triphæna fimbria*, bred from larvæ collected near Rotherham. Many specimens were light, and only very few of the dark form; it was stated that the colour variation was by no means sexual. Mr. Mansbridge, a long and very variable series of *Agrotis auxiliaris* from N. America, taken in 1893; and read a paper on the exhibit, describing the forms of variation, life-history, and distribution of the species. Mr. Barrett, two specimens of *Agrotis subgothica*, said to have been captured by Raddon, of Barnstaple; and also forms of *A. tritici* of the var. *subgothica*. A discussion ensued, in which it was conclusively proved,

by reference to Doubleday and others, that the *bona fides* of Raddon could not be relied on. Mr. Adkin read an addendum to his previous paper on *Triphæna comes* (*orbona*), giving more detailed evidence of the occurrence of the species and its var. *curtisii* in various localities. He also exhibited some Shetland forms of *Camptogramma bilineata*, one having a dark fascia, broad and complete, with a pale central blotch. Mr. Dennis exhibited microscopic slides showing the striking distinctions between the antennæ of *Hybernia aurantiaria* and those of *H. defoliaria*.

January 14th, 1897.—R. South, Esq., F.E.S., President, in the chair. Mr. Routledge exhibited specimens of *Acronycta menyanthidis* from Carlisle, with the thorax white; *Xylophasia rurea* from N. Devon, light grey, with fine lines; *Agrotis segetum*, with silvery fore wings and unusually white hind wings; *Noctua c-nigrum*, with the *c* reduced to two spots; and a specimen of *Triphæna pronuba* from Epping, with lunules on the hind wings. Mr. R. Adkin, *Tephrosia crepuscularia*, bred March, April, and (summer brood) June, some of the latter being equal in size to the former; *T. biundularia*, bred May: all from the London district. Also, on behalf of Mr. W. F. de V. Kane, *Dianthœcia capsophila* from a small island off the Kerry coast, with examples from Howth and Isle of Arran (Galway) for comparison; the Kerry specimens were unusually dark for the species, and were bred. Mr. Hewett, of York, a varied series of *Tæniocampa munda* from York, including a fine mahogany-coloured form; a melanic var. of *T.* (*cruda*) *pulverulenta;* a series of vars. of *Abraxas grossulariata*, including var. *varleyata*, bred from a wild larva; the various forms of *Arctia lubricipeda*, including a series of intermediate forms; a preserved larva, from ova laid by a female *T. munda* taken *in cop.* with a male *T. stabilis* at York, 1896; series of vars. of *A. sylvata* (*ulmata*), one being suffused and several unusually free from markings; three females of *Odonestis potatoria* of the male coloration; and three *Saturnia carpini*, one having left hind wing very pale, one very dark male, and a female having hind wings approaching the male coloration. Mr. Barrett, on behalf of Mr. Kane, a specimen of *Boarmia repandata* var. *destrigaria*, *Phothedes captiuncula*, and *Aciptilia tetradactylus*, from Ireland; also a series of *Eupithecia consignata*, bred "in and in" continuously since 1874, and only on one occasion, some ten years ago, had a wild strain been introduced; at first they gradually deceased in size, but after the introduction of a wild strain and the sleeving-out process, they increased both in size and depth of colour. Mr. Tutt, a long series of *Acherontia atropos*, bred by Mr. Borroughs, of Rainham, showing considerable variation in the colour of the "skull." He did not consider the species adapted to exist in this country; the specimens exhibited had been forced. Mr. McArthur, a living larva of *Aplecta occulta*, and a bred series of *Heliothis peltigera*. Mr. Young, of Rotherham, very long series of *Spilosoma lubricipeda*, var. *zatima*, and var. *fasciata*. To illustrate his paper, Mr. Hewett exhibited very long series of both broods of *T. crepuscularia*, and also series of *T. biundularia;* these were from some fifty or sixty different localities. Most of the known forms were shown, as well as preserved larvæ. On behalf of Mr. de V. Kane, the latter species from Irish localities; and both species from Swansea, on behalf of Mr. Robertson. He then read a most exhaustive paper on these two species, and included in it were the observations and experiments of more than fifty

well-known entomologists, who had been interested in this question. In the discussion which followed, Mr. South asked: (1) Did any character exist by which the species could be separated with absolute certainty? (2) Which was the commoner species? To the former no answer was forthcoming; but to the latter members agreed that *T. crepuscularia* was very local, while *T. biundularia* was more common. Mr. Barrett was of opionion that as a result of Mr. Hewett's paper all distinctions between the two were swept away. Mr. Tutt insisted that the naming of the two forms and the consideration of them as distinct, although very closely allied, was a matter of convenience, necessitated in our comparisons with continental and Asiatic representatives. Messrs. Carpenter, Bacot, and others continued the discussion.

January 28th.—The President in the chair. This was the Annual Meeting, and devoted to receiving the Report of the Council, the reading of the balance sheet, and the Address of the retiring President. The Officers and Council elected for the ensuing year were:—President, R. Adkin, F.E.S.; Vice-Presidents, R. South, F.E.S., and J. W. Tutt, F.E.S.; Hon. Treasurer, T. W. Hall, F.E.S.; Hon. Librarian, H. A. Sauzé; Hon. Curator, W. West (Greenwich); Hon. Secretaries, Stanley Edwards, F.L.S., F.E.S., and Hy. J. Turner, F.E.S.; Council, Messrs. C. G. Barrett, F.E.S., A. W. Dennis, H. S. Fremlin, F.E.S., W. Mansbridge, F.E.S., A. W. Mera, Hy. Tunaley, F.E.S., and Col. C. E. Partridge. Mr. South then delivered his Address. After referring to the excellent position which the Society still continued to maintain in membership and usefulness, as well as in its finances, he pointed out various practical lines of study which members of the Society might take up. He spoke of the extraordinary interest shown in natural history by the general public, as evinced by the success of so many recent publications on the subject. After enumerating the new additions to the British fauna, he remarked on the growing interest taken by British entomologists in European Lepidoptera. In reference to the study of variation, he considered that more attention might be paid to the geographical distribution of varieties. He stated that classification seemed to be in a state of chaos, the several works recently issued on Lepidoptera differing very materially in nomenclature and arrangement.

February 11th.—R. Adkin, Esq., F.E.S., President, in the chair. Mr. Barrett exhibited specimens of a species new to Britain, *Platyptilia tesseradactylus*, taken by Mr. de V. Kane in the West of Ireland; the specimens were greyer than the usual German form. Mr. Routledge, a fine var. of *Dianthœcia conspersa*, bred from Orkney; it was generally ochreous, the usually white markings being grey. Mr. Tutt, dead larvæ of *Hepialus lupulinus* which had been attacked by a fungus; living larvæ were also shown which had nibbled the dead ones. On behalf of Mr. Fletcher, of Worthing, he exhibited a series of hybrid Zygænidæ, from continental *Z. ochsenheimeri* and British *Z. filipendulæ*, which hybrid race was perfectly fertile. Also, on behalf of Mr. Prince, of Cheshire, a large box of common species, showing the local forms and range of variation; among these the *Nyssia zonaria* was most interesting for the variation in the transverse lines. And, on behalf of Dr. Chapman, the living larva of *Bryophila perla*, showing its silken gallery to which it retires during the day; it was noted that the

species did not hybernate, but fed all the winter. Mr. McArthur, a specimen of *Aplecta occulta*, just bred from a Rannoch larva. Mr. Adkin, a series of the same species, part taken and part bred from larvæ taken at the same locality; they were of good size, and very darkly marked. Mr. Perks, specimens of the "jumping bean," a Mexican fruit containing the larvæ of *Carpocapsa saltitans*. The remainder of the evening was devoted to the exhibition, by means of the lantern, of some sixty photo-micrographic slides of insect anatomy, by Mr. F. Clark aided by Mr. Furneaux, F.R.G.S.; some of the prepared objects from which slides had been made were kindly lent by Mr. W. West, of Streatham. Mr. Clark first showed, by means of diagrams, his method of making the slides; and then went on to exhibit various forms of antennæ, the tracheæ, several forms of the tongue, the compound eye, scales of Lepidoptera, hairs of common larvæ, and a most interesting series of the parasites of man and animals. The large screen used had been bought by Mr. Edwards, and most kindly presented to the Society, which is now admirably equipped with a lantern and all appliances for demonstration purposes.—Hy. J. Turner, *Hon. Report Sec.*

Lancashire and Cheshire Entomological Society.—*December* 14*th*, 1896.—Mr. S. J. Capper, President, in the chair. A paper was read by Dr. J. Harold Bailey entitled "Notes on a Day's Beetle Collecting in Shropshire," in which he recounted the various species taken, and stated it was a ground over which the late Charles Darwin had often worked for coleopterous insects. Mr. H. B. Prince also read a paper entitled "Experiences in Lepidoptera in 1896." The author, after referring to the general scarcity of insects during 1896, especially in the autumn, drew attention to the controversy now going on as to whether Lepidoptera were over-collected to the point of extermination, which led to considerable discussion. Mr. Pierce stated that no one who had ever visited the fen district, or such places as Barnwell Wold, could for a moment believe that over-collecting could account for the disappearance of *Polyommatus dispar* or *Lycæna arion*. Liverpool entomologists, he said, were especially favourably situated for observing local species, and mentioned *Nyssia zonaria*, which in some seasons was so abundant that it was impossible to walk without treading on larvæ at each stride; yet every now and then the species had gradually disappeared entirely from a locality, and would certainly have been lost had it not been re-introduced by Mr. Gregson and others. *Bombyx trifolii* was very similar. Efforts to re-establish *Lycæna arion* and *Orgyia dispar* had entirely failed, even for one season, although the experiment had been tried with the latter many hundreds of times in different parts of the country; the opinion of those present being that it was not to man, but to other agencies, that the disappearance of certain species from Great Britain was attributable. Dr. Bailey exhibited a large number of Coleoptera, the result of the day's collecting. Mr. Prince, Lepidoptera to illustrate his paper. The President, a long series of *Argynnis paphia* and *Melitæa artemis*. Mr. Pierce, *Vanessa c-album* and var. *hutchinsoni*. Mr. Webster, pieces of wood infested by *Cossus ligniperda* from a garden at Huyton.

Annual Meeting, Monday, January 11*th*, 1897.—The President, Mr. S. J. Capper, in the chair. Mr. F. N. Pierce, Hon. Sec. *pro. tem.*,

read the Report of the Council, from which it appeared that nine meetings had been held during the past year, at which valuable papers had been read, and many interesting exhibits shown. The following officers were appointed for the ensuing year:—President, Mr. S. J. Capper. Vice-President, Rev. F. Freeman. Hon. Secretary, Mr. F. N. Pierce. Hon. Treasurer and Librarian, Mr. H. Locke. The following gentlemen were elected on the Council:—Mr. W. E. Sharp, Dr. J. W. Ellis, Messrs. W. Webster, B. H. Crabtree, and Douglas Walker. The President, in his Annual Address, said:—

"On the 21st of next month the Lancashire and Cheshire Entomological Society will have attained its twentieth anniversary. The first meeting was held at my house, Huyton Park; it then numbered only eleven members, *viz.* Messrs. N. Cooke, Mountfield, N. Greening, T. J. Moore, Birchall, Carrington, Roxburg, Whitby, Johnson, Cross, and myself. Twenty years in the retrospect is a long period, but it has passed so quickly that I find it difficult to realise so long a time has elapsed since that happy occasion. The meeting at my house had been anticipated by one at Mr. Nicholas Cooke's, Wallasey, Cheshire, a few weeks previously, at which, however, I was not present, when the formation of such a Society was determined upon, and the office-bearers proposed, and Mr. Cooke was requested to ask me to become President. When Mr. Cooke informed me of all this I was much surprised, but at nothing more so than at my being selected to occupy such an honourable position. I told Mr. Cooke that he was the right man for that office, but at his persuasion I agreed to accept it for one year, but only conditionally, that he undertook to do so the next. Strange to say, circumstances happened to prevent this, and I find myself, after nineteen years, still your President. On similar occasions I have urged upon you the desirability of choosing some other member than myself to preside over you, and three years ago stated that, having given so many inaugural addresses, I felt myself exhausted for new material, so that if you persisted in electing me I must at any rate be relieved from this duty. Two years ago our then Vice-President, Mr. W. E. Sharp, kindly gave the address. Those present when he did so, or those who have perused it in its printed form [Entom. xxvii. 81], will remember the originality and the new lines of thought it evoked,—how, in his introductory remarks, he stated that 'Entomology is at best but a partial science, and is only a small fragment of the great science of Biology, and yet Entomology and Entomologists existed before ever Biology, under that name, was invented.'

"Let us very briefly glance over the progress made by the Society, the kind of work which has occupied its attention, and at a few of the many lectures given and papers read at its meetings during these nineteen years of its history. The next meeting after the one at my house was held March 26th, 1877, in the room we now occupy, the use of which was kindly granted us by the Museum Committee. The number of new members joining us was considerable, so much so that I find no less than fifty-seven members recorded in the first printed Annual Report for the session 1881. It is interesting to state that no fewer than sixteen of these are still members, *viz.* R. Brown, H. Capper, J. R. L. Dixon, Dr. Ellis, E. D. Jones, W. C. Gardner, J. T. Green, *W. Johnson,* S. L. Mosley, F. N. Pierce, T. Roxburg, W. E. Sharp,

E. P. Thompson, J. Vicars, R. Wilding, and myself. Whilst it is gratifying to find that so many old members are still with us, it is sad to state that eleven of those fifty-seven are since dead, many amongst whom were much-loved friends of my own, and such as are irreplacable.

"At present we have sixty-nine members, so in this respect are in as flourishing a condition as ever; but for the past year or so the attendances at our meetings have not been such as we could desire. Nothing is more discouraging, when a good lecture or paper is brought before the meeting, than to find only a poor audience. I would, therefore, urge upon each member who desires the continued prosperity of the Society to consider the second Monday in the month an engaged evening, and by his presence prove his interest.

"Considering the very great attention that has been given in late years as to the cause of melanism in Lepidoptera, and the numbers of papers that have since been read before societies like our own, or published on the subject, it is most interesting to state that at the first meeting of our Society our then Vice-President, Mr. Nicholas Cooke, read a paper on the subject. He drew attention particularly to the great change that had taken place, and that within a very few years, in several species of Lepidoptera in Delamere Forest, drawing attention specially to *Amphidasys betularia* and *Tephrosia biundularia*, which from almost white forms had become almost black. His suggestion that this was owing to a very large extent to the chemical fumes and coal smoke appears probable, though not in the way that any of us, with the exception of himself, thought, owing to a chemical deposit in the food so affecting the larvæ; for if I remember rightly those who took part in the discussion were of the opinion that the smoke discoloured and darkened the branches and the foliage of the trees, rendering the light forms more conspicuous to their enemies, so leaving the darker forms to propagate their species. His paper was published in the 'Entomologist,' vol. x. p. 92, and led to a very lengthy discussion, in which Dr. Buchanan White, Mr. E. R. Robson, and others took part; nor do I think that we have even yet arrived at a satisfactory conclusion, notwithstanding the investigations of Lord Walsingham in 1884, and Mr. Tutt's exhaustive treatise on 'Melanism and Melanochrism,' published October, 1891. My point is that our Society was the first that paid much attention to this interesting subject.

"This was soon after followed by a lecture on the Genital Armature of the Lepidoptera, by Mr. Benjamin Cooke. I believe Mr. B. Cooke was the first person who called attention to this subject, and at this lecture he gave us his experience of many years' investigations. I remember how interested we all were, but we had no microscopic lantern to illustrate his remarks, but simply a pocket lens. Mr. Cooke had acquired a great deal of valuable knowledge on the subject, having devoted to it many years of careful study and thought. It was his intention, when more satisfied with his conclusions, to make them known to the public, but his premature death deprived the world of the results of his valuable researches, not only in this department, but also in many others of equal interest. It has been my privilege to enjoy the society and friendship of many men taking the highest position as entomologists, but I think I never met with a keener and

more thorough scientific observer than Mr. B. Cooke, and with one who had so much knowledge of insect-life generally; and yet unfortunately he has left hardly any record of all his life's work. Some few years after this lecture, Dr. Buchanan White published his observations on the subject in the 'Transactions of the Linnean Society.' Most interesting is it, however, to state that, without the knowledge of the work that had been done in this direction by others, our Secretary was engaged in the same study, and by his lectures before our Society, and literary communications on the subject in our magazines, has made himself famous in the entomological world. It is not my place on the present occasion to do more than thus allude to the work done by Mr. Pierce. Almost the last lecture given at our Society was a most interesting one by him on that subject, a lecture that makes us proud of such a member.

"The interesting paper 'On the Wings of Insects,' by Mr. C. H. Hesketh Walker, October 25th, 1886, and published in the 'Young Naturalist,' is one of great originality of thought, and has led to much investigation, being indeed a new theory on the development of the wings of insects, based upon very careful microscopic study. This, like the 'Genital Armature' of Mr. Pierce, opens up subjects for endless enquiry.

"Familiar as most of us now are with the works of the late Dr. Darwin, twenty years ago his ideas were neither understood nor appreciated as they are at the present time. Converts, however, had been increasing, especially amongst men of science, since the publication of the 'Origin of Species,' in 1859. This has gone on up to the present date, when it is rare to meet with a man of culture who is not one of Dr. Darwin's disciples. We shall therefore expect to find papers on this subject; nor are we disappointed. Amongst others, Dr. Ellis, on Aug. 28th, 1878, read us a paper on 'Darwinism: its Relations to Entomology'; on June 26th, 1882, the Rev. S. Fletcher Williams one, on 'Darwin and Darwinism'; and on Oct. 29th, 1883, Mr. Henry Capper, 'Darwinism and Beauty.' These papers were all thought worthy of publication, and each led to most interesting and instructive discussions at our meetings.

"As a student of the Homoptera we have, as a honorary member, Mr. Robert Newstead, of Chester, who for a number of years has contributed original papers on his investigations of the British Coccidæ, dealing fully with the habits, metamorphoses, and structural characters of these obscure and little-known insects. In his first paper, read in 1890, Mr. Newstead described, as new to science, *Dactylopius walkeri*, K., *Eriococcus insignis*, N., and *Ripersia fraxini*, N., all of which he had himself discovered in Cheshire. During the years which have followed, Mr. Newstead has published, in the Ent. Mo. Mag., a series of papers on 'British and Foreign Coccidæ,' and quite recently has communicated a paper to the Entomological Society of London on 'New Species of Coccidæ collected by the Rev. A. E. Eaton in Algeria.' When we consider the amount of work Mr. Newstead has gone through in connection with the museum at Chester, we may well wonder how it is he has been able to describe over forty new species of scale insects, and clear up the synonymy of many doubtful species. All his diagnoses are clearly given, and accompanied by carefully prepared drawings,

which add much to the value of his contributions. Many of us remember with pleasure Mr. Newstead's exhibition of coloured drawings intended for the first Revisional Monograph of the British Coccidæ, which, I am glad to say, the Ray Society will shortly publish. The volume will be a valuable contribution to our entomological literature.

"Mr. Newstead's abilities as an ornithologist are also well known, and his bird-groups have gained for him a world-wide reputation. In this connection I must mention a paper he contributed to our Society on 'Insects found in Birds' Stomachs,' which was the result of some 500 *post-mortem* examinations. Over-pressure of other work has prevented the publication of this contribution, but I am assured it will appear in due course. But in order that we may gather somewhat of the nature of his observations, Mr. Newstead has favoured me with one of his charts, which is of importance, as it clearly shows the economic value of his investigations.

"Most of my Addresses to you in the past have more or less treated on Economic Entomology, as it is a subject in which I take much interest; and we have had numerous papers bearing on the subject, notably those by Mosley, Chappell, Thorpe, and Gregson, which have all contained much valuable information and led to much discussion; whilst for a considerable period Dr. Ellis, who was then our Secretary, acted as Recorder of Economic Entomology for the counties of Lancashire and Cheshire. The past twenty years have witnessed wonderful strides in the lines of Economic Entomology, especially in the American States, Canada, and Australia; but these countries do not immediately concern our Society, though we hail with pleasure the efforts of such men as Prof. Riley, Prof. French, and our hon. member Prof. Fletcher, who have done so much to make this branch of our study a practical science. The latter gentleman, by his kindness in forwarding to our Society his publications, keeps us informed of the vast work done at the experimental farms in this branch. But what has been done in this line in our own country mostly concerns our Society, especially when we remember that some of our own members have taken no mean part in the work. Miss Ormerod commenced her work in 1877, by the issue of a pamphlet (eight pages) calling attention to certain insects more or less generally injurious, and her yearly Reports, ever increasing in bulk, interest, and usefulness, have appeared regularly ever since. It is to the indefatigable and disinterested efforts of that lady that this subject owes the position that it occupies in this country to-day, which, though far from what we would like, and very inadequate to the importance of the subject, is certainly much in advance of what it was when this Society came into existence. If nothing further had been done than Miss Ormerod's elaborate Reports on the Warble Fly and the Turnip Flea Beetle, these amply testify to the usefulness of the work, the former pest particularly having been considerably reduced and almost exterminated in some districts, in consequence of her instructions having been followed out. It is a matter to be regretted that in this very useful work Miss Ormerod should have received no support from the Government of this country.

"Some Reports, commenced in 1886, have been issued from the

Board of Agriculture, and papers on injurious insects are continued by Mr. Whitehead in the 'Journal of the Board of Agriculture,' but a good State Entomologist is yet a desideratum in this country.

"The Royal Agricultural Society in 1889 determined to employ a young man, and allow him to train himself for the work; but after he had issued one Report, severely criticised by Miss Ormerod, he seems to have disappeared. The old Collection of Injurious Insects fitted up by the late Andrew Murray at Bethnal Green Museum has been remodelled by the late Prof. Westwood and our member Mr. Mosley, and placed in the South Kensington Museum. Similar collections have been placed in the Government Museums at Kew, Dublin, and Edinburgh; and the subject has been taken up by several county councils, particularly Cheshire, where another of our members, Mr. Newstead, has made himself exceedingly useful in lecturing on the subject.

"Perhaps the most valuable work that has engaged the attention of our Society has been the compiling of the Lepidoptera Fauna of Liverpool and neighbourhood, and the Coleoptera of Liverpool and neighbourhood. This undertaking was commenced in 1882, and to Dr. Ellis, who acted as editor, the greatest credit is due. It is only a few days since Mr. Barrett, writing to me, said how much he valued and how frequently he referred to our Lepidoptera Fauna as to localities for his work on British Lepidoptera, which will probably be the text-book for the next generation. Mr. Sharp is engaged in preparing similar catalogues on the Hemiptera-Heteroptera; whilst Mr. W. Gardner is preparing one on the Hymenoptera. These catalogues, I understand, will all be based on the original lists we now possess, prepared by our late member, Mr. Benjamin Cooke; they are added to year by year, and so kept up to date.

"Very briefly have I this evening glanced at some of the work we have accomplished during the past twenty years. There is every cause for congratulation and encouragement. We have been far from an idle Society, and the work that we have done has been of the greatest scientific importance. From its commencement no fewer than 196 papers or lectures have been given, the greater part of which dealt with new and important subjects relating to entomological science. For twenty years our meetings have been held with the utmost regularity, and the ever-increasing interest in Entomology has been marked by constant additions to our ranks. Most of the old school of naturalists have been removed by death, leaving their empty chairs to be filled by those of new energy; and I would, therefore, again urge our younger members to assiduous and careful work, not merely in the collecting of specimens, but in a better and more perfect understanding of the science.

"To the younger worker our library is open for reference; he will find there most of the text-books and standard works upon Entomology, together with periodicals devoted to our particular science for the past twenty or thirty years.

"Finally, in making a retrospect glance at the rise and progress of the Society, I see every cause for congratulation on the self-evident success of a career extending over a fifth of a century. We have no cause to be ashamed of our labours; and I have no hesitation in saying that few scientific societies can boast of a better record of

original and useful work than the Lancashire and Cheshire Entomological Society."

February 8th.—The President, Mr. S. J. Capper, F.L.S., F.E.S., in the chair. The Rev. R. Freeman gave a lecture entitled "Elementary Biology and Anatomy of Insects," in which he traced the connecting links from the protoplasm amœba to the perfect insect, describing in detail the organs of nutrition, the nervous system, breathing organs, &c., of insects. The lecture was fully illustrated by diagrams from the author's preparations. Mr. John Watson, of Manchester, exhibited specimens of *Belenois teutonia* and *B. nisea* from Australia, and showed transitional forms from the New Hebrides, proving that these two species must now be considered as only local forms of the one. He also showed *Eurycus cressida* and form from North Queensland. The Rev. A. M. Moss exhibited a curious bronze-coloured variety of *Amphidasys prodromaria* captured by himself at Windermere. Mr. Gregson, a box of asymmetrical specimens of Lepidoptera, the collection including two fine varieties of *Arctia caia* the fore wings of one specimen being very different.—F. N. Pierce, *Hon. Sec.*

Cambridge Entomological and Natural History Society.—*January 15th*, 1897. The President, Dr. Sharp, in the chair. Mr. Fleet exhibited a good specimen of *Cleonus nebulosus*, a large weevil, from the crop of a stone-curlew purchased in the market. It was suggested that a probable locality for both bird and beetle was Brandon. Dr. Sharp exhibited a fine mass of the cocoons of *Aphomia sociella* picked up in the neighbourhood; also some remarkable dipterous larvæ, *viz.* an undescribed *Tabania* larva, from the New Forest, with feet disposed all over the body, and somewhat allied to *Tabanus spodopterus* (he thought it might be a larva of *Atylotus*); larva of *Scenopinus fenestralis* from Bucks (he called attention to the importance of ascertaining whether this larva is injurious as commonly supposed, or whether it is present in woollen goods only to destroy other larvæ, such as those of the clothes-moth); larva of *Microdon*, found in Portugal by Colonel Yerberry, which shows no sign of segmentation; also *Idolothrips spectrum*, sent by Mr. Froggatt from New South Wales.

January 29th.—The President in the chair. The President exhibited a specimen of a large click-beetle of the genus *Chalcolepidius*, and showed that if the anterior parts were separated from the after-body and then replaced, the front part would be propelled to a distance from the body; he therefore concluded that the explanations ordinarily given of the jumping of the click-beetles was unsatisfactory; and he suggested that it might be found that the act really depended on an elasticity arising from the mode in which the parts of the meso-thorax and elytra were shaped and fitted together. Mr. Rickard read a paper upon "Jumping Beans." He said that probably the larva, after consuming all the internal portion of the seed, attacked the shell; in this endeavour to obtain food it pulls at the remaining shell, and the efforts supply the motive-force to which the jumping is due. He thought that the actual motion was merely mechanical, and determined by the formation of the euphorbiaceous seed.

Birmingham Entomological Society. — *November 16th*, 1896.—Mr. G. T. Bethune-Baker, President, in the chair. Exhibits:—By

Mr. W. H. Wilkinson, a collection of insects made in the Madeira and Canary Islands in February, March, and April, 1896, he gave an account of his visit to the Islands and of the collection. He visited Funchal, Madeira; Orotava, Teneriffe; and Las Palmas, Grand Canary; Orotava being the best collecting ground. He found *Anosia plexippus* and *A. chrysippus* very plentifully, especially the former, in Grand Canary; *Vanessa callirhoë* was also common in Grand Canary; *V. cardui* and *V. huntera* both occurred; *Gonopteryx cleopatra* was common, and many others. Mr. Bethune-Baker said that the most interesting species in the collection were *Pararge xiphia* from Madeira, and *P. xiphioides* from Grand Canary, two closely allied but distinct species, peculiar to the Madeiras and Canaries respectively; also *Lycæna webbiana*, of which there were four specimens, an interesting little species restricted to the Canaries. He called attention to the fact that the *G. cleopatra* from these islands differed decidedly from the Mediterranean form of the species. He also showed series of *Pieris brassicæ*, of *P. wollastoni* from Madeira, and *cheiranthi* from Canary, and pointed out the curious fact that *wollastoni*, although nearer to the European *brassicæ* than *cheiranthi* is, is yet the more widely divergent species; also a series of *Lycæna webbiana*, and of *Anthocharis charlonia* from Algeria, a species which he said also occurred in the Canaries. Mr. Kenrick said that the most curious feature in the Canary Islands fauna was the occurrence of American forms; *V. huntera* occurred only in the Canaries and America; and *A. plexippus*, which is common in the Canaries, is an American species. Mr. Bethune-Baker said that in working at the moths he noticed American affinities in several groups, particularly in the genus *Phlogophora*, which was much more closely allied to American than to European forms. By Mr. Bradley, for Mr. J. W. Moore, a remarkable variety of *Arctia caia*, bred from a lot of larvæ collected locally and reared under natural conditions; the markings were all in their usual positions and shapes, but the whole insect was of a rich dark brown, the markings on the under wings showing black, and on the upper wings a lighter brown. By Mr. J. T. Fountain, *Melitæa artemis* from Umberslade; a bleached specimen of *Epinephele ianira* from Wyre Forest; a specimen of *V. io*, from Kniver Edge, the two sides of which were unequal in size; a specimen of *V. atalanta* with white spots in red bands, from Bournemouth, and another from Himley, near Dudley, with the red bands broken; a specimen of *Apatura iris* in which the bands of the posterior wings on the upper side were small and bent inwards, and on the under side only shown as paler bars, not white ones; the under sides, too, were very slightly marbled, nearly plain, with less white on the fore wings than usual; the purple iridescence on upper sides could be seen on all wings at once, not on only one side at a time as usual. By Mr. W. Bowater, a lot of butterflies, unnamed, collected about 500 miles up the Niger river. Mr. Kenrick said that one *Pieris* seemed to be new to him. By Mr. H. Taylor, *Luperina cespitis* from Yardley, *Eugonia erosaria* from Wyre Forest, *Tethea subtusa* from Wyre, and *Cirrhœdia xerampelina* taken this autumn at Steckford. By Mr. Bickley, *C. xerampelina* from Steckford. By Mr. C. W. Wynn, *Gortyna flavago* from Sutton, *Neuronia popularis* from Yardley, *Oporina croceago* (a bred series from

Wyre Forest); *Trichiura cratægi* from Wyre, *Asphalia diluta* from Sherwood Forest, and *Calocampa exoleta* from Sutton. By Mr. C. H. Kenrick, *Tephrosia crepuscularia* and *T. biundularia;* he expressed the opinion that they were but one species, and that locally it was single-brooded and consisted of light and dark forms mixed. By Mr. H. Foster Newey, a number of drawings of larvæ. A communication from Mr. R. W. Fitzgerald was read, giving a list of the Macrolepidoptera collected and observed by him within a radius of four miles of Uley, near Dursley, Gloucester. It contained the names of 286 species, and included *Vanessa antiopa* (taken on Nov. 3rd, last), *Chærocampa porcellus* (abundant in 1896), *Setina irrorella* (one), *Xanthia aurago* (common in 1895), *Polia flavicincta*, *Chariclea umbra* (one at sugar in 1896), *Phibalapteryx tersata*, and *P. vitalbata*, &c. By Mr. R. C. Bradley, a collection of Diptera made at Bournemouth during the first fortnight of August, 1896; it included *Geranomyia unicolor*, *Xanthogramma ornata*, *Myopa fasciata*, *Miltogramma punctata*, and *M. conica*, *Idia lunata*, &c.; the last species was formerly considered doubtfully British by Mr. Verrall.

December 21*st*.—The President in the chair. Exhibits:—Mr. Bethune-Baker, for Mr. Abbott, three female specimens of a *Lycæna* taken by Mr. C. B. Antram at Upfield, Sussex; they were suffused with blue, and were believed by the captor to be hybrids between *L. icarus* and *L. agestis*. Mr. Bethune-Baker said they were a not unusual form of the female of *L. icarus*, which he had from several localities. By Mr. R. C. Bradley, *Emmelesia ericetata* from Inverness-shire, &c. By Mr. Abbott, a fine bred series of *Agrotis ashworthii;* they had been reared from eggs laid in 1896 by a bred female, and had been forced through. He also showed a yellowish form of *Arctia caia*, and a specimen of *Spilosoma fuliginosa*, in which the black markings of the hind wings had been splashed across the fore part of the wings. By Mr. Martineau, a very fine photo slide, by R. W. Chase, of larvæ of *Sphinx ligustri*. By Mr. Bethune-Baker, spiders taken by Mr. W. H. Wilkinson in the Canaries and Madeiras.

January 18*th*, 1897.—The President in the chair. Mr. A. E. Cutler, 13, Portland Road, Edgbaston, was elected a member of the Society. Exhibits:—By Mr. A. H. Martineau, *Crabro interruptus* from Solihull (one specimen, taken June 14th, 1896), and *Bombus latreillellus* var. *distinguendus* (taken at Sutton in June last). By Mr. R. C. Bradley, *Lophyrus pini* (one, bred, from Sutton). By Mr. Bethune-Baker, two cases of palæarctic Papilios, with nice series of all six species, including var. *feisthamelii* of *Papilio podalirius* from Algeria, &c., var. *latteri* from Algeria, var. *zanclæus* from Greece, and *P. machaon* from the British Isles, Italy, &c., those from the south being darker. By Mr. P. W. Abbott, a very fine variety of *Argynnis euphrosyne* from Wyre Forest, taken by Mr. H. McNaught; on the upper side the outer two rows of spots on the fore wings were much enlarged longitudinally, and on the hind wings all the black markings were much enlarged and suffused, so that they were very dark; on the under side the black markings had almost disappeared, the fore wings being pale with indications only of markings; on the hind wings all the basal two thirds were pale yellow, the outer third being orange; the black markings were gone, and the silver ones lengthened out radially. He also

showed a fine example of *Fidonia atomaria* from Shirley Common, taken by Mr. C. B. Antram in June, 1896; it was of a uniform dark brown above and below.

February 1st.—Annual Meeting.—The President in the chair. The Annual Reports of the Council, the Treasurer, and the Librarian were presented. Mr. Bethune-Baker was re-elected President; Mr. P. W. Abbott, Vice-President; Mr. A. H. Martineau, Librarian; Mr. R. C. Bradley Hon. Treasurer; and Mr. C. J. Wainwright, Hon. Secretary. Exhibits:—Mr. J. T. Fountain, *Cirrhœdia xerampelina* and *Luperina cespitis*, both taken in the Pershore Road, close to Birmingham; also *Erebia blandina* from Aberdeenshire, and a number of Swiss Erebias and other Rhopalocera. By Mr. P. W. Abbott, a series of *Cucullia chamomillæ* from Sutton, at various dates; they were all very dark specimens, excepting one, which was taken in 1894 and was rather small and very pale. By Mr. Cutler, specimens of *Arctia caia*, one pale and one very dark, but crippled; both from the same batch of larvæ, and reared together.—Colbran J. Wainwright, *Hon. Sec.*

North London Natural History Society.—The fifth Annual Exhibition was held in the Lecture Hall at the N.E. London Institute, on Saturday, January 2nd, 1897. The exhibits were, if anything, even more numerous than last year. The entomological department was, as usual, the best represented, but botany was also very much to the fore. Lantern illustrations were once more on view, Mr. Wattson contributing "Life in a Pond," and Dr. Gerard Smith attracting great attention with photo-micrographs illustrative of plant morphology, marine zoology, &c. Short lectures were delivered during the evening, by Mr. Bacot "On behalf of Insects," by Mr. Wattson on "Pond Life," and by others. The exhibition was unanimously admitted to be the best the Society had yet held.—Lawrence J. Tremayne, *Hon. Sec.*

The Entomological Club.—Since our last report the following meetings of the Entomological Club have been held, namely:—On July 7th, 1896, at the residence of Mr. Samuel Stevens, when the time-honoured "strawberry feast," which in the olden days was held annually in the neighbourhood of the then prolific hunting-ground of Birch-wood Corner, was duly celebrated; on November 24th, at the residence of Mr. Robert Adkin; and on January 19th, 1897, at the Holborn Restaurant, when Mr. G. H. Verrall entertained representatives of leading entomological associations and others, to the number of about fifty. At this meeting a resolution was unanimously passed by the members present that the Club collections should be placed in the custody of the South London Entomological and Natural History Society. These collections contain, among other interesting material, certain type specimens, and it is hoped that when deposited with the above Society their usefulness will be increased by their being more easily accessible than is now the case.

THE ENTOMOLOGIST

Vol. XXX.] APRIL, 1897. [No. 407.

ON THE SUBORDINATE INFLUENCE OF CLIMATAL CONDITIONS IN DECIDING THE MORPHOLOGICAL CHARACTERS, WITH SPECIAL REFERENCE TO THE RHOPALOCERA.

By W. Harcourt-Bath.

The preponderating influence of the organic environment in determining the distinctive or morphological characters of the Rhopalocera is probably much less apparent than real. It is, however, a more difficult task to prove than its influence with respect to their geographical and vertical distribution. Nevertheless, I am perfectly convinced myself that the climatal conditions similarly play only a subordinate part in the matter, and what effects derive their origin from the physical environment do not possess the determining factor, and only operate upon the organism indirectly.

I will endeavour to support this hypothesis by certain facts and conclusions which I have obtained during the course of my investigations respecting the various problems connected with their vertical distribution.

I will first of all add a few words to the article by my pen which appeared in the December (1896) issue of the 'Entomologist' with reference to the latter subject. The conception I have formed of the phenomenon presented by the various zones of vegetation, with their accompanying fauna, stretching from the equator upon either side to the two poles, and likewise from the bases of the various mountain chains to the line of congelation, is that it represents a somewhat parallel or analogous case to the phylogenetic and ontogenetic stages in the progress respectively of genera and species. This is, of course, not strictly the case, but it represents in a very fair degree the

changes that have been going on during past ages, and are still proceeding. The different zones of vegetation which one meets with in ascending a mountain therefore present, in my mind, their respective antiquity—by no means accurately so, as I have already said; but the higher one ascends the more ancient will become the prevailing constituents of the flora of each particular phyto-geographical belt, together with its accompanying fauna. The higher zones constitute, as it were, the final sanctuaries of many species which are unable to modify their characters in harmony with the ever-changing organic conditions by which they are surrounded, and are practically in the same position as islands. As new conditions manifest themselves at the bases of the mountain chains from time to time, in the appearance of new types of animals and plants with more highly specialized powers of adaptation, they will make their presence felt all along the line from the bases upwards, the constituents of each zone rebounding, as it were, on the one above, like waves upon the sea-shore, the more ancient in turn succumbing to the next in the order of succession. A typical instance of this change, independent of any apparent alteration in the climatal conditions, is to be found in the Scandinavian peninsula at the present day, where the existing flora of the lower zones is gradually receding before an Oriental one, which is slowly but surely making its way westwards from Siberia. Some remarkable changes of a somewhat similar character concerning the arboreal vegetation have also occurred in Denmark within historic times.

Such evolutions as these must be affecting the distribution of the Rhopalocera to a considerable extent, for the larvæ, being dependent upon the plants for their sustenance, will either have to retreat with their pabula, or succumb, unless they can conform themselves to their altered surroundings. Temporary fluctuations or return waves will periodically manifest themselves, such, for instance, as the clearly ascertained fact of the comparatively recent more elevated extension of the pine forests in the Alps, and this will react upon the zones below, together with their insect inhabitants, in the manner I have endeavoured to exhibit.

The organic environment therefore clearly plays a preponderating part in the distribution of organisms, while that of the physical only a subordinate one, and this generally in an indirect manner. While the former will operate almost exclusively in curtailing their distribution downwards, the latter will exert its influence principally in deciding their upper rather than their lower limits. Another important item worthy of special consideration and investigation by biologists is the fact that the vertical and horizontal conditions affect the flora in a different degree to that of the fauna. In the former kingdom whole tribes and families seem to be similarly affected in respect

to their distribution, whereas in the latter the environmental influence seems principally confined to species. While we thus have whole genera of plants confined to particular zones upon the mountains, the same in the case of animals may be completely cosmopolite. This conclusion will be very evident to those who have made a special study of their vertical distribution in the Alps, and is particularly so in the case of the Rhopalocera.

Thus in the latter all the principal genera are cosmopolite, or nearly so. Consider, for example, *Pieris*, *Colias*, *Lycæna*, *Vanessa*, *Melitæa*, *Argynnis*, *Erebia*, *Pararge*, *Cœnonympha*, *Syrichthus*, and *Hesperia;* while others—such, for instance, as *Papilio* and *Polyommatus*—also possess a very wide range in respect to altitude. On the other hand, the various genera of plants are often considerably very circumscribed in their distribution, frequently being confined to only one or two zones upon the mountains. The inference to be drawn from these facts seems to be that the organic environment acts more powerfully in the case of the animals, the physical conditions manifesting their influence to a somewhat greater extent in the plants.

Now let us consider a few facts concerning the relationship between altitude and morphology.

It is too readily taken for granted similarly that butterflies owe their remarkable diversity of colours and patterns to the direct influence of the climatal conditions.

Much has been written on this subject by Dr. A. R. Wallace in favour of the preponderating influence of the organic environment. It is my intention in the present paper to confine my attention to two phases only, namely, melanism and ocellation, with special reference to the alpine Rhopalocera.

As regards the first of these, many hypotheses have been from time to time put forward to account for its existence. Thus some writers of the old-fashioned school (like Mr. C. W. Dale) seek to find a direct cause in the abundance of the precipitation and the amount of sunshine. They assume that bright colours are the direct products of the sun. How then do they account for the fact of there being such a large proportion of dull-coloured species of butterflies inhabiting the tropics? Take a glance, for instance, at such a work as Mr. Distant's 'Rhopalocera Malayana,' if a collection of exotic forms is not available for inspection. It will be seen that the proportion of dull and sombre coloured species is quite equal, indeed if it does not exceed, the proportions existing in temperate climates (such as that of Europe) in comparison with the number of light coloured forms. Then how do they account for the following fact? If we compare two species belonging to corresponding groups, one of which is found in Europe or Japan, and the other

in India, we shall generally find that the Indian insect is the smaller and duller coloured of the two.

It is therefore evident that we can dismiss the idea that the colours of butterflies are directly due to the abundance or absence of sunshine. Everything, on the contrary, seems to point to their being the outcome of the organic environment. Other writers (like Mr. Tutt), more in harmony with the natural selection school, maintain that colours with a melanic or melanochroic tendency are useful to their possessors by enabling them to resemble their surroundings, especially when they reside at high altitudes among the mountains, and thus enable them, when at rest, to escape detection by their enemies. When this is the case at the lower elevations I can quite agree with them that the value of these sombre hues is considerable under certain circumstances, but when it exists in the higher zones, where insectivorous birds, mammals, and reptiles are generally so scarce, its purpose is not so easy to comprehend.

Another hypothesis, with especial reference to the genus *Erebia*, has been launched forth by Lord Walsingham, to the effect that their dark colours, by rapidly absorbing the solar rays, give their possessors greater vitality when on the wing than would otherwise be the case. This character, he supposes, would be especially beneficial to the males in searching for the females; in other words, it is of selective value. Now it is well known that rich colours in nature are generally correlative with considerable vitality, and it is thus exceedingly probable that the darker colouring of the males is beneficial to their possessors in the manner indicated; at the same time I do not consider that it constitutes the origin of the particular pigmental colouring of the genus, the primary purpose of which will have to be sought for elsewhere. In support of my contention may be brought forward the fact that there are a large number of light-coloured butterflies also existing at the higher elevations along with the various melanic species of *Erebia*. Some of these are almost exclusively white. A list of these pre-eminently xanthochroic species, which I have encountered in the Alps and the Pyrenees between the altitudes of 5500 and 9000 feet, is as follows:—*Parnassius apollo*, *P. delius*, *P. mnemosyne*, *Aporia cratægi*, *Pieris brassicæ*, *P. rapæ*, *P. napi*, *P. callidice*, *P. daplidice*, *Euchloë belia* var. *simplonia*, *E. cardamines*, *Leucophasia sinapis*, *Colias palæno*, *C. phicomone*, *C. hyale*, *C. edusa*, and *Rhodocera rhamni*. Some of these I have seen in considerable profusion at the elevations of 7000 and 8000 feet. There are also a considerable number of species whose representatives in the higher zones are of a lighter or brighter coloration than the forms existing at the lower elevations.

On the other hand, melanism exists at lower levels as well as at the higher ones, such, for instance, as in *Polyommatus phlæas*

var. *eleus*, *Cœnonympha pamphilus* var. *lyllus*, *Melitæa didyma* var. *alpina*, some of them being exclusively found at the lower elevations.

Now respecting ocellation. Dr. A. R. Wallace's theory to account for the predominant character which manifests itself in the Satyridæ, as well as in other groups of butterflies, namely, in the submarginal ocellation of both the upper and the under sides of the wings, is that the eye-like spots are useful for protective purposes. Being situated at a distance from the most vital parts of the insects, he considers that they are the results of natural selection pure and simple. The enemies of the butterflies, principally birds, he presumes, would most likely make for the most conspicuous part of the insect, both when at rest and when flying, and these would in most cases be the ocelli. This being so, it would afford the possessor a chance of escape. In this connection I may here remark that I once captured a specimen of *Colias edusa* which showed unmistakable signs of having been so attacked, and of its consequent escape. Some small bird had probably bitten at the eye-like spot upon the under side of one of the posterior wings while the butterfly was in repose, as a piece had been bitten clean out of both sides from thence to the hind margin. I have frequently seen specimens of the Satyridæ served in a similar manner.

Presuming that Dr. Wallace is correct in his hypothesis, I have endeavoured to prove it by investigating the conditions under which ocellation exists in the Alps and the Pyrenees, where there is plenty of scope for an enquiry of the kind, but the data and material at present collected are inadequate to enable me to make any definite pronouncement either in favour or against his hypothesis. I first of all started with the assumption that ocellation would appear more highly developed upon the wings of those specimens occurring at the lower levels and at the lower latitudes. But in this respect I have at present found the evidence largely of a negative character, which is, however, equally discomforting to those who consider that the abundance of sunshine is the direct cause of the increased ocellation. Thus, while there are some species, such as *Erebia ligea* and *Cœnonympha arcania*—if we consider the forms *euryale* and *satyrion* respectively only alpine varieties—exhibit increased ocellation at the lower altitudes, others, such as *Pararge mœra*, *Erebia stygne*, and *Cœnonympha pamphilus*, do not appear to be similarly affected.

These facts, taken in conjunction with those almost equally as negative respecting the melanistic tendencies of butterflies at high altitudes, evidently belong to the same category of phenomena. The only solution out of the difficulty I can see is that both melanism and ocellation were originally developed at the lower levels for protective purposes, where the organic

environment would be more severe, but that they are now retained not because they are any longer required for the same purpose, but by reason that they prove of value in other ways; thus, in the case of ocellation in the genus *Erebia*, for purposes of specific identity and recognition; and, in the case of melanism, as enabling its male possessors to compete more successfully for the members of the other sex, by reason of their enhanced vitality.

Birmingham, Dec. 14th, 1896.

THE PROBABLE CAUSES OF THE DECADENCE OF BRITISH RHOPALOCERA.

By G. Harold Conquest.

With reference to Mr. W. Harcourt-Bath's interesting article on this subject (*ante*, p. 55), I should like to state that it appears to me that Mr. Bath does not lay nearly sufficient stress upon the operations of agriculture as a factor in the extinction in so many localities of the rarer of our British Rhopalocera.

I should say ninety-five per cent. of the extinction has been caused by the operations of our friend the farmer, *i. e.* in the cutting down of our woods and forests, the draining of our fens and marshes, the burning of the furze and indigenous flora of our hillsides, and all the various operations incident to the improvement of the land from a farmer's point of view.

It seems almost puerile to hold collectors, law of amixia, bad seasons, &c., responsible, when one considers the vast changes that agriculture has wrought over the face of a great portion of the British Islands during even the last hundred years, and the enormous destruction of large classes of lepidopterous insects, including of course the Rhopalocera, consequent thereon.

The following examples will, I think, support my contention that it is to the operations of agriculture that the extinction or rarity of many of our British butterflies is chiefly due:—

Papilio machaon.—Formerly abundant in the fen-lands of Cambridgeshire and Huntingdonshire; now, owing entirely to the drainage of the fens for agricultural purposes, confined to the small area of Wicken Fen in Cambridgeshire. *P. machaon* is of course still plentiful in the Norfolk broad district, owing to the fact that its habitat there has not been destroyed for agricultural purposes.

Polyommatus dispar.—Extinct as a British insect, owing to the destruction of its habitat for agricultural purposes.

Apatura iris, Limenitis sibylla.—Formerly in comparative abundance in many localities; now comparatively rare, and

occurring in only a few localities, owing to the destruction of woodlands. *A. iris* is often exterminated, although the woods in which it used to occur still exist, owing to the constant cutting away of the undergrowth during winter and early spring, and the consequent destruction of the hybernating larvæ. I could give several instances of this did space allow.

Melitæa athalia, *M. aurinia* (*artemis*).—Now extinct in many localities where formerly abundant, chiefly owing to destruction of woodlands and heaths, and (in the case of *M. aurinia*) draining of marsh and fen-land. *M. athalia* is now, I fear, extinct as an Essex insect; in quite recent times it could be taken in two places at least in this county; both localities have been destroyed for agricultural purposes.

Thecla pruni, *Carterocephalus palæmon* (*paniscus*). — Both species now confined to a few localities (woods) in our midland counties. It is only reasonable to suppose that both these insects must have occurred freely over the counties in which they have been taken, prior to the destruction of the woodlands of these counties. I consider therefore that their present restricted range, and liability to possible extinction as British insects, to be entirely due to the destruction of their habitats for agricultural purposes.

Lycæna arion. — Having personally collected in the chief localities in this country where *L. arion* is or has been taken, I have formed the opinion that agriculture is practically the sole cause of the now comparative rarity of this species; even at Barnwell Wold, where large numbers were undoubtedly taken by collectors, the insect did not become extinct until the fields in which it occurred were burnt by the agriculturist. In the Kingsbridge (South Devon) locality this same burning has been the chief cause of its destruction. *L. arion* still exists on the Cotswold Hills in Gloucestershire, and used to be taken in many other localities in the same county until it was wiped out by agriculture; its continued existence on the Cotswold Hills is due to the fact that the ground on which it occurs has not been broken up for agricultural purposes.

I could cite further examples in support of my views, but those mentioned will, I think, suffice.

Mr. Harcourt-Bath's article refers to British Rhopalocera only, but the evil effects of agriculture (from an entomological point of view) are quite as apparent in the case of many of the Heterocera.

In conclusion, I should wish, in support of my theory, to refer to the simple fact that it is precisely those localities that have been the least affected by agricultural operations that now form our best collecting-grounds; witness the New Forest, practically the last stronghold of many of our woodland Lepidoptera; the broads and fens of Norfolk; the hills and moun-

tains of Scotland and the North of England; and, finally, the cliffs and uncultivated slopes by our sea-shores. The latter frequently form the last resting-place for many species after agriculture has done its best (or worst) to drive them from their native land.

58, Hatherley Road, Walthamstow, March, 1897.

As a practical observer and collector for many years, I should, if asked the cause of the decadence of British Lepidoptera, unhesitatingly say it arose from cultivation and rapacious collectors chiefly. When a student at a well-known Agricultural College on the Cotswolds in the sixties, I was acquainted with one or two isolated and small colonies of *Lycæna arion;* these have long since disappeared owing to farming operations in the form of mowing and feeding. Any one acquainted with agriculture must know how closely sheep tread, feed, and crop the herbage; these must frequently destroy the ova and larvæ of butterflies. As regards collectors, one told me some years since that when *L. arion* was in its glory on the Cotswolds he had taken as many as forty in a morning.

At the present time I do not know where to find it. Should any collector be fortunate enough to discover any new locality, I sincerely hope he will not record it; though slight, it will be an assistance towards preservation. Though late, I believe much might be done if collectors would be content with a small series of a species. Personally, I fail to see the utility of a large one, when there is no variation; and rows crowded together hide the form and outline of an insect, and certainly do not add to the picturesqueness or artistic view of a cabinet.

As regards *Lycæna arion*, I believe it to be also one of those delicate and sensitive creatures which are unable to withstand much interference with their surroundings. Cultivation must in the long run destroy many of our Lepidoptera, but that is no reason why we should assist in the work of extermination by over-collecting.—T. B. Jefferys; 17, New King Street, Bath.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 62.)

Boarmia gemmaria, *Brahm.*—Decidedly local, and not frequently met with; but appears more plentiful in the suburbs of towns than in country districts. Varies widely, as in England, and the var. *perfumaria* occurs with the type at Howth, Clonbrock, and elsewhere. The larvæ are often to be found on ivy

in the autumn. Howth, Kingstown, Phœnix Park, and elsewhere near Dublin; Co. Wicklow (*B.*); Cappagh, Co. Waterford, numerous; near Kenmare, Co. Kerry; Mallow, Co. Cork (*Stawell*); Clonbrock (*R. E. D.*), and Kylemore (*Hon. Emily Lawless*), Co. Galway; Markree Castle, Sligo; Tempo Manor (*Langham*) and Enniskillen.

Boarmia cinctaria, *Schiff.*—A local species, probably having a far more general distribution than appears from my list of localities. Most of the great tracts of moor and mountain scrub in Ireland probably harbour this handsome insect; but at the early season of its emergence these wild districts are rarely explored by the entomologist. The females are frequently very small and inconspicuously marked. A larger proportion of the males in Killarney and Glenveagh, Co. Donegal, are strikingly barred with white or pale grey than is met with, I believe, in the New Forest, being generally characterised by darker bands strongly contrasting with a pale ground colour. Again, we find that the very different climate and rainfall of Donegal and Kerry does not appear to have differentiated the pale and dark varietal forms. One example from Colonel Cooper's woods near Markree Castle, Sligo, has all the wings whitish grey traversed only by a brown basal band, and a slightly pencilled, festooned, elbowed line crossing both pairs of wings; with a faint subapical shading on fore wing, and a trace of a submarginal line on the hind wing. The imago being frequently found on birch trunks, it is possible that where these are frequent, natural selection has encouraged the paler forms. There are few handsomer geometers in a cabinet than a good series of variable Irish *B. cinctaria*. Common at Killarney; and Glenveagh, Co. Donegal (*W. E. H.*); and has occurred sparingly at Clonbrock, Co. Galway (*R. E. D.*); Markree Castle, Sligo; and Kells, Co. Meath (*Mrs. Cuppage*).

Tephrosia consonaria, *Hb.*—Stated by Mr. Birchall to be "common in Wicklow and Kerry." At Derrycunihy and Mucross, Killarney, I have taken it in moderate abundance, but the Wicklow habitat must be a strictly limited one. Professor Hart, Mr. M. Fitzgibbon, and myself have collected frequently in spring in various parts of the wooded districts of Wicklow, from Powerscourt to Arklow, but have never met with it. The only other locality I know of is Clonbullogue, King's Co. (*E. S.*).

Tephrosia biundularia, *Bork.*—Some years ago I recorded the capture of *T. crepuscularia*, Hb., from Ireland, but subsequent enquiry, and a more extended acquaintance with the present species, compel me to retract the statement. Representative series of the Irish insect have been sent to Mr. Tutt and other English adherents of the dual theory, and they have all been referred to *T. biundularia*, Bork. For some years, like other

collectors who have a one-sided experience, I inclined to ignore the existence of *T. crepuscularia* in its varied forms, but the recent careful discussion of the subject has modified my incredulity. Yet the evidence brought forward by Mr. Tutt, judging from what has been published, appears to me still somewhat incomplete and unsatisfactory. His *résumé* of the controversy, so far as it has yet been printed, is a destructive criticism of various statements put forward by those who would merge the two species; but the actual tabulated facts necessary to prove the "separate and distinct life cycles" require to be more precisely set forth to compel conviction; and when dates are given, the year and locality are not mentioned,—an essential when a range of nearly three months fluctuation is claimed for the date of emergence of both species in differing seasons. It is alleged that a clear four or five weeks elapses "between the first emergence of *T. crepuscularia* and that of *biundularia;* and another three or four weeks between the latter and the second brood of *T. crepuscularia* in any given year." If this has been proved to be the case to the satisfaction of the members of the Entomological Society, before whom the discussion took place, the separation of the two species needs, I think, no further demonstration. But has anyone such a continuous serial collection, labelled with dates, and collected in localities approximate in climatic conditions? That there is but one species in Ireland all the evidence to hand tends to prove, but it is impossible to predicate a distinct negative so long as the fauna remains so ill explored. I have, however, examples from eleven different places, and have sampled specimens from at least as many more, and one important point which bears on the controversy is that in no instance have I met with any *Tephrosia* in Ireland earlier than the end of the first week in April, though the climate of Derry and Down differs from that of Kerry as much as that of Scotland from Devon; nor have I any evidence of the occurrence of a second brood. In June, at Killarney, I have found the insect still plentiful, though mostly worn. If, therefore, *T. bistortata* from Perth emerge in March (a particular which I have not yet seen clearly stated), I should consider the case in favour of two species a very strong one. A comparison of fifty-two Irish specimens with some twenty English *T. crepuscularia* shows that the former are of a clearer ground colour, less powdered with dark scales; with the elbowed line but faintly shaded externally in most cases. Nevertheless, three or four examples taken with the ordinary form in the same locality cannot, I think, be separated from *T. crepuscularia;* and though the average expanse is less, some Irish *biundularia* attain an equal size with it. I cannot accept the dictum that the colour and pattern of the two species furnish alone a sufficient basis for separating the species, because both are very variable, and

their variations may become stereotyped into local varieties, as with the melanic form. But this, in conjunction with a different period of emergence, which is the most important matter to place beyond controversy by long series with full data, would decide the question. The moth is abundant in almost every wooded district I have visited in Ireland, both in the north, south, and west. The females appear to be paler generally than the other sex, and the emergence is continuous from toward the end of April to about the first of June. Occasional examples are met with in mid April or earlier in favourable seasons. A smoky form was found on Slieve Donard, above Newcastle, Co. Down, by Mr. Watts, which is heavily charged with dark scales, but is not at all so black as the melanic Yorkshire variety, and is characterised rather by the partial obsolescence of pattern. I have seen nothing similar elsewhere. Some localities in which this moth occurs are as follows:—Powerscourt, Co. Wicklow; Cappagh, Portlaw, and Dromana, Co. Waterford; Glengarriff, Kenmare, and Killarney; near Limerick; Clonbrock and Mount Bellew, Co. Galway; Markree and Rockwood, Sligo; Favour Royal and Altadiawan, Co. Tyrone; Drumreaske, Monaghan; Enniskillen, Newcastle, Co. Down; Farnham, Cavan; Knock Ion and Killynon, Co. Westmeath.

(To be continued.)

LEPIDOPTERA IN 1896.

(Continued from p. 74.)

Notes from Ringwood.

The season from March to the end of August here was exceptionally dry and sunny, with a very slight rainfall; the entomologist was consequently on the alert, as many insects were only out for a very limited time, a week's delay in some instances, and captures would be most unsatisfactory. *Emydia cribrum* only lasted for a few days. The season after August was rainy, and rarely fine enough for collecting. Common larvæ upon the oaks were extremely abundant; by quietly standing under the trees, the movements and droppings of the larvæ falling upon the shrubs sounded like a shower of rain; the trees in many cases were almost bare, but the second growth of foliage in June put them in trim again. The following is a partial account of insects taken or bred:—

Jan. 22nd. *Hybernia progemmaria*. 28th. *Vanesa io*. 29th. *G. rhamni*.

Feb. 11th. *Vanessa urticæ*. 12th. *Amphidasys prodromaria* bred. 17th. *Tephrosia crepuscularia*. 26th. Sallows out; also the usual moths upon them. 28th. *Hybernia leucophæaria*, abundant.

March 2nd. *Trachea piniperda*, *Tæniocampa miniosa*, and *Cymatophora ridens*, in numbers; also *Arctia mendica*. 14th. First *Notodonta chaonia*, seven in all bred. 17th. One *Venilia maculata*. 21st. *Gonepteryx rhamni*, very common. 23rd. *Phibalapteryx tersata*, emerging daily, larva found upon clematis. 24th. *Pieris rapæ* out. 25th. Saw two or three

Lycæna argiolus, the earliest I have seen. 26th. Ova of *Liparis monacha* hatching.

April 3rd. *Tephrosia extersaria* caught. 4th. Larvæ of *Callimorpha dominula* and *Chelonia caia*, common about four miles from here. 7th. *Pieris rapæ*, common; *Eupithecia rectangulata*, common. 23rd. *Boarmia cinctaria*, well out; took fifty good specimens; it varies very much in ground colour, and the transverse lines in some cases unite just above the inner margin. It is a curious fact that this species and males of *Hybernia leucophæaria* have similar habits and parallel varieties: put a varied series of each side by side and this will be seen; both drop off from tree-trunks obliquely and simulate death; a novice in either case would think it to be a dead leaf falling; occasionally, of course, both species fly away direct.

May 2nd. *Lycæna argiolus*, abundant; *Platypteryx unguicula* and *Phytometra ænea*, common; *B. cinctaria* very abundant. 5th. *Anthocharis cardamines*, *Satyrus egeria*, and *megæra*, common. 7th. Took forty good *B. cinctaria* and left scores upon the trees; *C. dominula*, *C. caia*, and *Psilura monacha* now pupating. 8th. *Polyommatus phlæas*, *Lithosia aureola*, *Cidaria corylata*, *Larentia berberata*, *Vanessa io*, *V. polychloros*, *Syrichthus alveolus*, *Thecla rubi*, several; *Lycæna argiolus*, still out, but worn. 13th. *Limenitis sibylla*, larvæ common; to-day I took an almost pure white *Boarmia cinctaria* in perfect condition. 14th. *Tæniocampa miniosa*, larvæ extremely common; *Cilix spinula*, *Fidonia piniaria*, *Thera variata*, and *Platypteryx lacertula*, all common; pupa and larva of *Pericallia syringaria*, upon honeysuckle. 15th. *Eurymene dolobraria* out; *Emmelesia alchemillata* and *E. albulata*, very common; *Thanaos tages*, common; *Lithosia rubricollis*, at rest; *Macroglossa bombyliformis* (broad border), common at bluebells; one *M. fuciformis* only. I got about fifty larvæ of *Leucania littoralis* from Mudeford, near Christchurch, from which I have bred out a nice series; also a few *Aspilates citraria*, and later *Zygæna filipendulæ*, from the same place; whilst at Christchurch *Z. trifolii* was abundant. 18th. I was delighted to see *Pieris brassicæ* fairly common, after an absence of several years. 23rd. *Callimorpha dominula*. I bred seven good specimens of the yellow var. *rossica*, Kol. 26th. Larva of *Iodis vernaria* abundant upon clematis in my garden, many full fed. Larvæ of *Thecla betulæ* common; beat above forty to-day; many small ones put back again upon the sloes; *Argynnis euphrosyne* well out. 31st. Two *Acronycta alni* bred.

June 1st. *Lithosia mesomella*, *Scodiona belgiaria*, and *Aspilates strigillaria*, appearing; the heat to-day was unbearable, although in the early morning there was a frost. Last season (1895) *Emydia cribrum* appeared upon June 4th; this year (1896) on the 1st, when I took forty-one, and on the 2nd fifty-two, time to give friends warning: so wrote to two or three, who put in their appearance in due course. The first day we averaged about twenty-five each, but upon comparing notes of course each stated it to be much less; very few collectors like showing their captures, or giving numbers, when a good insect is discussed. Larvæ of *Orgyia fascelina* is generally distributed upon the heaths. 4th. A thunder-storm, with heavy rain, which was most welcome; first rain for months. 5th. *E. cribrum* almost over; saw four only. 13th. *Thecla betulæ* larva very plentiful, full fed; *Argynnis paphia* out; to-day beat over a hundred larvæ of *Cymatophora ridens*, eight *Notodonta chaonia*, and several *Psilura monacha*. 15th. One *Melanippe galiata* upon heath. 20th. *Heliothis dipsacea*, abundant; netted forty-one to-day; also a few *Euthemonia russula*. 24th. *Tephrosia biundularia* out; to-day boxed eight *Boarmia*

roboraria; Iodis vernaria emerging; I bred out two or three dozens. 29th. *L. littoralis* emerging from pupa.

July 5th. *Limenitis sibylla, Argynnis adippe, A. paphia,* and var. *valesina,* all very common. 11th. Netted a good series of *Acidalia straminata; T. betulæ* emerging freely from pupæ; bred several dozens. Entomology is almost at a standstill; temperature 82° in shade; vegetation parched up. I went over to Brockenhurst, on a visit to my friend Mr. Stokes, in search of "crimsons"; two nights produced thirty *Catocala promissa,* and over sixty *C. sponsa,* both species very abundant. *Orgyia fascelina* emerging. 28th. Saw two or three female *Lycæna argiolus,* second brood, feeding upon bramble bloom; it is curious that I never see any of the spring brood outside the forest, whilst the second one is scattered all around.

Aug. 1st. *Gnophos obscurata* and *Selidosema plumaria,* common. Several *Acherontia atropos* larvæ. I was rather late in looking for this larva, but by the appearance of the potato plants it must have been abundant. 24th. Rainy weather has really set in now; useless to try for insects. 27th. Second brood of *Anaitis plagiata,* common; also a few *Cidaria immanata.* 28th. *Stilbia anomala* making its appearance to-day; I took two males and one female; several later. I take them at dusk; they fly low; also search palings for them. The palings around the forest enclosures are studded with nails half driven in, and bent over, each exhibiting about an inch of its length; in searching for *anomala,* look amongst the nails, as the insect at rest exactly resembles one; wings tightly rolled around its body, pointed crest standing erect, the resemblance is extraordinary, but of course it is really meant to mimic dark irregular pieces of bark upon trees, and in the latter position I have often obtained them.

Anthocharis cardamines has been abundant; the general forest butterflies also; but what (to me) is a mystery is that although the larva of *Thecla betulæ* is always very common, I rarely see the perfect insect. This species usually comes out in August, and its flight is during the morning, about midday; in collecting I must pass many, as the ova are deposited upon the very lowest sloe-bushes. I have seen specimens flying over oak-trees, but have never seen one settle low down.

I was glad to see *Pieris brassicæ* again, as it has been extinct around here for some three or four years, and I think in this case the wasps were the cause, rather than its usual parasites. The last batch of larvæ I saw here was in my garden, upon curly kale. I was about to collect them, when I observed a wasp approach. I kept quiet and watched; it settled upon the plant and made direct for a larva, and with celerity killed it, sucked a quantity of the juicy fluids, and rolled the remainder up with its fore feet and mandibles into a round mass, and so flew away with it. I waited, and within a few minutes the business was repeated; I took the remaining larvæ. Wasps and hornets were very numerous at the time; the larva of *P. brassicæ,* being gregarious and conspicuous, would fall an easy prey. I heard of a specimen of *Leucophasia sinapis* having been seen here, but have not had that pleasure myself, so far, although it used to be common; it is getting scarce in all parts of the Forest.

With the exception of *Vanessa urticæ* the Vanessidæ have been scarce. *V. polychloros* is very erratic in its appearance; some years common, others the reverse. *Thecla rubi* was common, but scattered. *T. quercus,* uncommon. No *Colias edusa,* so expect we shall have to wait for another flight from abroad. *Sarrothripa revayana, Halias prasinana,* and *H. quer-*

cana, fairly common. I found many empty cocoons of the latter under the trees; evidently the pupa had been extracted by tits. *Earias chlorana*, larvæ abundant upon sallow twigs. *Nola cucullatella*, also upon sloe. *N. strigula*, at rest. *Nudaria senex*, common in the meadows. *Calligenia miniata* and *Lithosia mesomella*. One *L. sericea* beaten from yew. *L. rubricollis* upon grass-stems. *Chelonia villica* seems spread about generally. *Arctia fuliginosa* upon heath. I had a larva of *Zeuzera æsculi* feeding inside a holly twig. *Lasiocampa quercifolia* occurs annually in the lanes. Upon a clump of heath I got over 150 small larvæ of *Saturnia carpini;* none were ichneumoned; they mostly pupated; in two cases two larvæ formed a common cocoon, and another formed an oblong cocoon with two perfect exits. Both broods of *Cilix spinula* occurred. *Thyatira derasa* and *T. batis* more plentiful than usual. I took a specimen of *Bryophila glandifera* ten miles inland; it is suffused with greyish green, the markings obscure. Larvæ of *Demas coryli* scarce. Pupæ of *Acronycta ligustri* from ash trees. *Diloba cæruleocephala* very abundant as larvæ, and during the first week in November the imago also; I watched one ovipositing upon an apple tree; it settled upon the under sides of the boughs, and whilst laying kept the wings vibrating. The eggs were placed in groups of three or four, and covered with down; the whole being done with celerity. *Noctua festiva*, *N. dahlii*, *N. brunnea*, and *N. baia* occurred. *Hecatera serena* and *Acronycta aceris*, from tree-trunks. At clematis, the latter part of September, I took five *Triphæna subsequa*, and one *Plusia festucæ*, very pale, but good. *Triphæna interjecta* and *Arctia mendica* I frequently saw flying over hedges in the daytime. I took a very small *T. pronuba*, unicolorous red, quite distinct from the usual varieties. One *Dasycampa rubiginea*, at ivy. Larvæ of *Trachea piniperda* very plentiful. I got one imago of *Tæniocampa munda* off sallow, with broad yellow outer margins. Also boxed one *Agrotis saucia* at ivy; the second taken inland. One *Epunda nigra* bred, Several *Anchocelis lunosa* beaten from firs; also two *Hepialus sylvanus*. *Cosmia affinis*, *Xylophasia rurea*, and var. *alopecurus*. *Leucania turca*, *Grammesia trilinea*, and var. *bilinea*, at sugar. *Cucullia verbasci* is another species which seemed to have disappeared, but the larva was abundant upon both mulleins. *Hadena oleracea* bred minus the red stigmata. *Xylina rhizolitha*, common at ivy. *Charæas graminis*, at light. *Plusia pulchrina* and *iota*, at flowers. Both broods of *P. chrysitis* abundant; blue, green, and bronze, both quite fresh, with perfect ciliæ. *Nonagria fulva*, at ragwort; also one *Agrotis obelisca*. *Anarta myrtilli*, bred two, without the usual white spots. *Plusia gamma* was extremely scarce. *Miana furuncula* swarmed in the fields, and good varieties were obtained.

Geometers, upon the whole, were fairly common. The following is a partial list of captures, &c.:—*Urapteryx sambucata*, abundant. *Epione apiciaria* and *E. advenaria*, uncommon. *Rumia cratægata*, both broods; second small. *Venilia maculata*, amongst bluebells (such a contrast). *Metrocampa margaritata*, *Ellopia fasciaria*, pupæ also beaten from firs; *Eurymene dolobraria*, *Pericallia syringaria*, *Selenia illustraria*, *S. lunaria*, *S. illunaria*, *Crocallis elinguaria*, larva from thorn in spring. *Ennomos erosaria*, pupæ beaten from beech. *Himera pennaria*, several beautiful females bred. *Cleora glabraria*, scarce. *C. lichenaria*, common. *Boarmia repandata* and vars. *B. consortaria* and *B. roboraria*. *Tephrosia consonaria*; *T. crepuscularia*, three broods. *T. biundularia*, uncommon; there is a characteristic difference between the last two species, the transverse lines in the latter being more oblique and better defined, the difference here being

marked. *T. extersaria*, pupæ beaten from oaks. *Gnophos obscurata*, abundant, and dark; I get them by searching cart-tracks: the ruts along the sides are a capital resting-place. . *Pseudoterpna cytisaria*, larva common upon a pretty dwarf furze. *Nemoria viridata*, common. *Iodis lactearia*, always plentiful, but the green quickly fades. *Ephyra punctaria* and *E. trilinearia*, common. I netted a good series of *Acidalia straminata;* also *A. subsericeata*, *A. imitaria*, *A. emarginata*, *Timandra amataria*, *Corycia temerata*, and *C. bimaculata;* I have found pupæ of the latter in mid-winter. *Aleucis pictaria; Macaria liturata*, both broods common. *Halia wavaria; Strenia clathrata*, singly. *Scodonia belgiaria*, *Selidosema plumaria*, *Aspilates strigillaria*, all common. Black-banded vars. of *Abraxas grossulariata* bred; larvæ extremely abundant upon sloe. I can never get them from currant trees in my garden, whilst wild plants in the meadows produce plenty; formerly I got them from trees against walls; evidently they dislike open places. *Ligdia adustata* and *Lomaspilis marginata*, fairly common. *Pachycnemia hippocastanaria*, extremely abundant upon heath; at dusk they simply swarmed for miles Several nice vars. of *Oporabia dilutata* bred. *Larentia didymata*, abundant. *Emmelesia affinitata* and *E. alchemillata*, in lanes. *E. albulata*, extremely common and variable. *E. decolorata*, scarce. *Lobophora sexalisata*, *L. viretata* (one only). Larva of *L. carpinata* upon sallows. *Thera variata*, and in company with the second brood I got two or three dozen good *T. firmata*. *Hypsipetes ruberata* and *H. impluviata*. *Melanthia ocellata*, both broods. *M. albicillata*, scarcer than usual. *Melanippe unangulata*. *M. rivata*, some very light, others nearly black. I took one *M. galiata* upon heath. *Anticlea berberata*, a few. *Phibalapteryx tersata*, common. *P. vitalbata*, one only *Scotosia dubitata*. and *S. certata*. *S. undulata*, scarce. *Cidaria psittacata*, at ivy. *C. miata*, bred. *C. corylata*, common. *C. immanata*, *C. suffumata*, *C. testata*, from heaths. *C. fulvata* and larva, from rose-trees. *C. dotata* and *C. associata*. *Eubolia cervinata*, larvæ abundant. *E. limitata*. *Anaitis plagiata*, two broods; second small. *Tanagra atrata*, common. *Botys hyalinalis*, several. *Pyralis farinalis*, by hedges. *Herminia tarsipennalis*, *H. barbalis*, and *Zanclognatha grisealis*. *Endotricha flammealis*, common. *Hypena rostralis*. *Aventia flexula*, two. *Cledeobia angustalis*, common. *Pempelia palumbella*, abundant; often mistaken for *E. cribrum*.

Two or three days in early August, at Swanage, produced:—A few *Arge galatea*. *Hesperia actæon* was very scarce; I did not take any. *H. thaumas*, common under the Castle Hotel. I saw one or two *Lycæna minima*, and I heard of a specimen of *Hesperia paniscus* having been taken there. *Melanippe galiata*, three. *M. procellata*, common. Two good *Sesia musciformis*. *Gnophos obscurata*, very abundant and varied; many very dark brownish grey, some approaching var. *calceata*. To obtain this species turn up flat stones; this mode is very successful; also put a stick in any hole amongst the rocks, and move it about; *G. obscurata* will fly out in numbers; but one has to be quick in netting them; they bolt with the rapidity of a rabbit. *Zygæna filipendulæ* was about the only common insect seen. Swanage is not much use for collecting after Bank Holiday; upon that day boys in numbers net and catch everything almost. On one occasion I saw one of these boys with a cyanide bottle nearly full of butterflies, many *actæon* amongst them; he of course had not even a collecting-box. I tried to give him a lesson, and to point out the waste, but it was useless. There were more than a dozen others doing likewise. *Actæon* cannot hold

out many years longer; it has got very scarce at Lulworth Cove already.—J. Hy. Fowler; Ringwood, Dec. 8th, 1896.

Notes from South Devon.

Though I have not found the past season a profitable one about here, yet a few notes may, I hope, be of interest. I returned to Devonshire in the latter part of March, and found insects swarming at the sallows. Perhaps the best nights were March 23rd, 24th, and 25th. On the 23rd *Tæniocampa cruda, T. stabilis, T. gothica, T. miniosa, T. gracilis, T. munda, Xylina petrificata, Cerastis vaccinii*, together with one *Agrotis segetum*, male, in fair condition (I was not aware that this species hybernated, though *A. suffusa* seems to do so, as I have taken it at the flowers of *Daphne mezereon*). On the 24th, a warm and thundery night with intermittent moonlight, moths fell from the sallows in countless numbers, a score or more being in the umbrella at the same time, the only good insect, however, being *Oporina croceago* (two). On the 25th I took an odd couple, viz. *H. progemmaria* male and *T. cruda* female. I failed, however, to obtain ova. On the 31st sloe-blossom proved almost as attractive as the sallows, which were getting over. Several Eupitheciæ were about, chiefly, I think, forms of *E. abbreviata*.

April 5th seems rather early for *Lycæna argiolus*, of which two females were seen (but no males till the 19th). Having to leave home on the 24th, I determined to make an effort to obtain larvæ of *Petasia cassinea*. Accordingly, my father and I went out on the 22nd with beating umbrella, but found the oak-coppice, which covers several hundred acres about a mile from my home, still brown and bare. So we tried our luck in searching young birches for larvæ of *Asphalia flavicornis*, with little success, however; but the first bush we searched (only about six feet high) yielded four larvæ of *Geometra papilionaria*, already, like the birches, in their green attire. On the low branches of another small birch I came across five young larvæ of *Trichiura cratægi*. On a little twig of the same I found four ova (hatched), which I suppose were of this species; they were bolster-shaped, and laid side by side transversely on the twig. *Gonepteryx rhamni* was flying freely, both male and female. We noticed one of the latter laying. The ova are placed singly on end on *Rhamnus frangula* (*R. catharticus* does not occur here). *Pieris rapæ, P. napi, Vanessa io, Lycæna argiolus, Anthocharis cardamines*, and *Pararge egeria* were also observed on the wing.

Turning our steps homewards, we found some young oak just in leaf. Now for the umbrella! In a short time we had beaten five small green larvæ, which I felt pretty sure were *P. cassinea*. I have often taken this larva before, but have found it very difficult to rear to the perfect state. Reaching home, I placed them in a nearly empty flower-pot with some twigs of oak, and, fearing that they would escape through the meshes if I covered the pot with net, I used paper instead. One of the larvæ promptly made its escape through a hole in the paper, which I believe it made for itself. The remaining four my father reared, and gave them a large pot of turf in which to pupate. This pot I turned out about the early part of July, and found four large pupæ at a depth of about three or four inches. I did this that I might watch the pupæ, and keep off insect pests. I replaced them at a slight depth, covering them with grass-roots, &c. One died about the middle of October; two moths emerged during November, male and female, but, alas! both cripples. They were kept in a pot with some flowers of

Jasminum nudiflorum, and the female gave me a batch of ova which I hope may prove fertile. The ova are large, round, and flat, and of a brown colour, looking very much like fine specimens of the "mealy bug." The remaining pupa is still lively, and intends, I am afraid, to lie over.

Returning home towards the end of June, I found almost all the early larvæ had disappeared. The drought and heat had hurried them through their larval state. On June 28th I obtained a fine larva of *Amphidasys betularia*, already full-fed.

On July 4th I found a small larva of *Notodonta dictæoides* on a small smooth-leaved birch. For some time it fed well on twigs of birch placed in water. One day, however, I gave it birch of a somewhat woolly texture. It refused to touch it, and kept crawling aimlessly about the pot. It was clearly getting very weak, and could hardly hold on to its food-plant. Suspecting the reason, I supplied it with smooth-leaved birch, and it at once found its appetite again, and I had no more trouble with it. About the middle of the month *Cleora glabraria* was fairly common in a larch plantation, where long tassels of lichen hang from the lower branches. *Boarmia abietaria* was also about at the same place, but difficult to capture, and possessed of a mysterious power of rendering itself invisible as it flitted into the shade.

During the early part of September *Luperina testacea* and its varieties came freely to light, along with a few *L. cespitis*. The latter seldom arrived before 11 p.m., and were all more or less worn. *Heliophobus popularis*, of course, came in swarms (all males; the only way to obtain females seems to be by netting at dusk in grass fields, or by sweeping). On Sept. 9th my brother found a fair specimen of *Acherontia atropos*, only just alive, on the ground outside the house. The insect looked as if it had been crushed, the thorax being nearly in two parts. I have searched many potato fields, but have never come across this moth before.

Ivy, which was well in flower by the end of September, has not been productive. I beat several "pug"-like larvæ from it. Some of these almost answered to Newman's description of *Lobophora viretata*. Others were green all over. They have now pupated. Casually looking over Greene's 'Insect Hunter's Companion,' I noticed he alluded to the attractive powers of sliced rotten apples. I determined to give them a trial. Some I sliced and pressed on, others which were very soft I smeared on the trees. The latter were decidedly the more attractive. I kept to the same trees, going round each night just after six p.m. Often the moths were already thick on the old patch. Usually they dwindled in numbers as night advanced. The following is a list taken from barely a dozen patches:—*Agrotis suffusa*, *A. saucia*, *A. segetum*, *Triphæna pronuba*, *Orthosia lota* (plentiful), *O. macilenta*, *Anchocelis rufina*, *A. pistacina* (in swarms and very variable), *A. lunosa* (*A. litura* is absent from the local list), *C. vaccinii*, *C. spadicea*, *Scopelosoma satellitia*, *Oporina croceago*, *Xanthia silago*, *X. ferruginea*, *Polia flavicincta*, *Epunda nigra* (two males, four females; never before ten p.m.), *Miselia oxyacanthæ*, *Agriopis aprilina*, *Phlogophora meticulosa*, *Hadena protea* (mostly worn, but some beautiful specimens), *Xylina rhizolitha*, *X. petrificata*, *Amphipyra pyramidea*. These were taken from Sept. 29th to Oct. 15th. The weather was very unfavourable, as it was usually either cold and clear, pouring with rain, or blowing half a gale.—F. G. Briggs; Fursdon, Egg Buckland, S. Devon, Dec. 17th.

Notes from the Southend District.

Coleophora albitarsella. Many cases of this insect observed on fences, over ground ivy, early in May.

Phorodesma smaragdaria. Hybernated larvæ not uncommon in May. First moth emerged June 2nd; a female netted at Benfleet, June 22nd. In 1895 I took three moths on June 24th, and bred my first female on June 18th. In 1894 I bred five moths on June 28th. I think, therefore, that the time given for the appearance of the perfect insect in Buckler's 'Larvæ,' vol. vii. p. 61, "about the middle of July," is a little too late. Confirmatory of this is a quotation from Peter Bouchard's diary, in the late Mr. Howard Vaughan's very interesting list of the Lepidoptera of Leigh, which reads: "June 20th, 1857. A fine female *smaragdaria.* I think it ought to be got earlier, near Leigh."

Epichnopteryx reticella. A few cases containing pupæ found in May at Canvey. A large number of males taken by assembling. It is worth a long walk to watch the movements of dozens of this most charming little insect. Very few flew direct to the decoy, but with quavering wings ascended to the top of the fine grass, showing unmistakable excitement.

Dichorampha sequana. At Benfleet, in May.

Lithosia complana. June 9th, one larva found on a lichen-studded post at Canvey.

Hesperia lineola. June 9th, one larva at Canvey. The butterfly was common at the end of the month.

Tortrix viburniana. June 9th, many larvæ in twisted tops of sea-wormwood at Canvey.

Senta maritima var. *bipunctata.* One only, at sugar, Benfleet, June 22nd.

Herminia cribralis. Not uncommon on reeds.

Eupœcilia atricapitana. Among ragwort at Benfleet, early in July.

Melanargia galatea. Several in one field only at Canvey.

Lycæna astrarche. August 3rd, large number observed at Canvey.

Scoparia pallida. On reeds in July at Benfleet.

Eupithecia subnotata. Flying over *Atriplex littoralis* at Benfleet.

Leucania straminea. Larvæ, June 22nd; imagines at sugared reeds in July.

Mamestra abjecta. At sugar in July; only one or two of the var. *variegata.*

Hydrœcia nictitans var. *paludis.* Not uncommon at sugared reeds. Var. *lucens.* One or two at the same time.

Agrotis tritici. One fine large well-marked specimen with broad pale costa.

Chilo phragmitellus. A few only.

Aglossa cuprealis. One specimen only, at rest on a fence.

During the continued wet weather in August and September I collected very few insects, the only captures worth recording being two specimens of *Cirrhœdia xerampelina.* A fine series of *Nonagria lutosa* was taken early in October on reeds at Benfleet, and one or two specimens of *Depressaria yeatiana,* and one *G. stigmatella* about the same time, at sugar.—F. G. Whittle; 3, Marine Avenue, Southend, March 1st, 1897.

Notes from Reading.

I reported early in the year the capture of a female *Endromis versicolor,* together with a batch of ova deposited on the same branch as that on which I had found the insect. Deeming it best, I devoted

my captive, which was of cabinet worth, to ova depositing, and thus ruined a noble specimen in the interests of breeding; and very interesting the breeding proved! *All* the ova were infertile! An attempt to rear a batch of *Boarmia consortaria* larvæ also proved most unsuccessful. They were sleeved on oak, and at first thrived well; yet, in spite of careful attention, dwindled away, and died off in a most discouraging manner. A friend, I am inclined to believe, must have cast an "evil eye" upon them, for no sooner had I told him of my small stock than out came the remark, "They'll all die in a month or so." Among other common things which have fallen to my lot whilst collecting in this neighbourhood have been *Leucophasia sinapis* (Reading finds itself in a proud position indeed, being able to quote an insect of which even the incomparable New Forest is, I believe, now void), *Gonepteryx rhamni*, *Argynnis selene*, *A. adippe*, *Thecla rubi*, *Sphinx ligustri*, *Macroglossa fuciformis*, *M. bombyliformis*, *Lithosia mesomella*, *Nemeophila russula*, *Hepialus hectus*, *Zeuzera pyrina*, *Pœcilocampa populi* (larvæ), *Bombyx rubi*, *B. quercus* (larvæ), *Drepana cultraria*, *Stauropus fagi*, *Lophopteryx camelina*, *Acronycta aceris*, *Hecatera serena*, *Acontia luctuosa*, *Catocala nupta*, *Eugonia alniaria*, *Hemerophila abruptaria*, *Boarmia consortaria*, *Tephrosia crepuscularia*, *Pseudoterpna pruinata*, *Zonosoma orbicularia*, *Panagra petraria*, *Eubolia palumbaria*, &c. An insect I have rarely met with of late is *Orgyia antiqua;* indeed, I do not remember to have seen a single specimen for six or eight years.

A glance back at captures by trap procedure brings the utterance that last year did not equal by a long way its forerunner. To note the falling away both in quality and quantity is at once both easy and disappointing, and the cause is apparently obscure. The nights, taken as a whole, have not been altogether unfavourable, and the trap's position, being precisely that of the bygone year, would not seem to account for the sad falling off. Whether others have this same misfortune to lament, I have not yet lighted upon the means of ascertaining. By the capture and report of one single rarity the trap's reputation is saved, and, by being unprecedented here, adds another important item to last year's list. *Agrotis cinerea* is, I believe, considered a Cotswold insect, yet until now not a single sign of it has been noticed, although both my father and I have worked the district for many years. This and two others, *Trichiura cratægi* and *Eurymene dolobraria*, seem alone to be eligible for the honourable position of "new captures." *Asteroscopus sphinx* always makes a reportable capture, but its appearance is erratic, and only rather above a dozen were taken or seen in November. The following make a somewhat uninteresting list, for which the trap is responsible:—

January has nothing to report of importance.

February.—*Phigalia pedaria* and *Hybernia progemmaria*, with a nice variation.

March.—*Tæniocampa incerta*, *T. stabilis*, *Hybernia defoliaria*, *Anisopteryx æscularia*, and *Anticlea badiata*.

April.—Nights not very favourable, and very few insects made any appearance.

May.—*Spilosoma lubricipeda*, *S. menthastri*, *Cilix glaucata*, *Apamea basilinea*, *Agrotis cinerea*, *Tæniocampa gracilis*, *Hadena thalassina*, *Rumia*

luteolata, *Selenia lunaria*, *Odontoptera bidentata*, *Himera pennaria*, *Strenia clathrata*, *Melanippe fluctuata*, *Anticlea derivata*, and *Cidaria miata*.

June.—*Spilosoma lubricipeda*, *S. menthastri*, *Cilix glaucata*, *Leucania comma*, *L. pallens*, *L. impura*, *Xylophasia rurea* var. *alopecurus*, *X. lithoxylea*, *X. sublustris*, *X. monoglypha*, *Mamestra basilinea* (not all common), *Grammesia trigrammica*, a fair number of the var. *bilinea*, *Noctua augur*, *N. c-nigrum*. *N. rubi*, *Dianthœcia capsincola*, *Hadena dentina*, *H. dissimilis*, *H. genistæ*, *Habrostola tripartita*, *H. triplasia*, *Plusia chrysitis*, *P. iota*, *Selenia lunaria*, *Odontoptera bidentata*, *Hemithea strigata*, *Acidalia emarginata*, *Timandra amataria*, *Phibalapteryx vitalbata*, *Cidaria pyraliata*, and others commoner.

July.—*Lithosia complanula*, *Bombyx neustria*, *Cilix glaucata*, *Leucania lithargyria*, *L. conigera*, *Cerigo matura*, *Amphipyra tragopogonis*, *Hadena dissimilis*, *Plusia iota*, *Uropteryx sambucaria*, *Pericallia syringaria*, *Selenia bilunaria*, *Crocallis elinguaria*, *Acidalia imitaria*, and *Coremia ferrugata*.

August.—*Trichiura cratægi*, *Neuronia popularis* (more females this year than last), *Luperina testacea*, *L. cespitis*, *Noctua xanthographa*, &c.

September.—*Trichiura cratægi*, *Luperina cespitis*, *Anchocelis pistacina*, *X. lunosa*, *Xanthia gilvago* (a few).

October.—*Cheimatobia brumata*, &c.

November.—*Asteroscopus sphinx*, &c.

December.—*Pœcilocampa populi*, &c.

Those taken by other means in the same neighbourhood include:—*Argynnis euphrosyne*, *A. aglaia*, *Melitæa aurinia* and var. (also a single specimen of this on high ground, near woods, and eight miles away from the big rendezvous), *Melanargia galatea*, *Pararge egeria*, *Epinephele hyperanthes*, *Thecla rubi*, *Lycæna argiolus*, *Nemeobius lucina*, *Sphinx ligustri*, *Chœrocampa porcellus* (in abundance), *C. elpenor*, *Smerinthus populi*, *S. tiliæ* (some fine forms), *Macroglossa stellatarum*, *M. bombyliformis* (narrow-bordered), *Ino statices*, *I. geryon*, *Zygæna trifolii*, *Z. loniceræ*, *Callimorpha dominula*, *Nemeophila plantaginis*, *Hepialus lupulinus*, *Drepana cultraria*, *Grammesia trilinea* var. *bilinea*, *Triphæna fimbria*, *Hecatera serena*, *Hadena genistæ*, *Xylina ornithopus*, *Cucullia verbasci*, *C. umbratica*, *Epione advenaria*, *Venilia maculata*, *Amphidasys strataria*, *Tephrosia consonaria*, *T. biundularia*, *Geometra vernaria*, *Zonosoma linearia*, *Z. punctaria*, *Minoa murinata*, *Abraxas sylvata*, *Emmelesia albulata*, *Cidaria suffumata*, *Eucosmia certata*, and *Anaitis plagiata*. *Chœrocampa elpenor*, *Callimorpha dominula*, and *Hecatera serena* are all "new takes." Those who have not yet captured the "scarlet-tiger" have an enviable treat in store.—C. J. Nash; Reading.

Sallows in Yorkshire, 1896.

Sallows were very productive in the neighbourhood of York last season, and whilst they were out I visited them on nine different occasions.

My first visit was on March 24th, when, accompanied by my friend Mr. E. G. Potter, we proceeded on bicycles to a wood situated some seven miles from York in a north-easterly direction. At this early date only two trees were in bloom, but moths were obtained in abundance from the first and largest tree. I spread a very large sheet under this tree, and shook the branches vigorously; on examination by the

aid of a lantern, the sheet was found thickly peppered with moths. *Tæniocampa munda* was the moth of the evening; it was in great force, and in splendid condition, evidently just out. As the result of the first shake I boxed seventy *T. munda*. A few *T. cruda*, *T. gothica*, *T. stabilis*, *T. instabilis*, *Cerastis vaccinii*, and *Panolis piniperda* were also in evidence.

On March 31st, in company with my friend Mr. B. H. Crabtree, of Manchester, we drove to the wood previously mentioned, and at about 8.30 p.m. commenced to work the sallows. Moths were by no means rare. We obtained *T. munda* (twenty-five males and sixteen females), *T. cruda* (sixteen males and nine females), *T. stabilis* (eighteen males and eight females); one of the female specimens of the last-named species was of a uniform reddish colour similar to the New Forest variety of *T. gracilis*. *T. instabilis* and *T. gothica* were only poorly represented; but of *P. piniperda* we got thirteen males and one female. Other species taken were *Lobophora lobulata* (two males and two females), *Anisopteryx æscularia*, also one example of *Hybernia marginaria* var. *fuscata*. We stayed until 10.45 p.m. Night chilly; wind due north.

On April 2nd I visited the above locality, and commenced operations about 8.30 p.m. Moths scarce. I saw *T. cruda* (six males), *T. stabilis* (four males and one female), and *T. munda* (two males). Night was cold, with wind due north; sky clear and starry.

On April 3rd, in company with my friend Dr. H. Corbett, of Doncaster, I visited some sallows at Wadworth Wood, some three miles from Doncaster. Here we found the sallows nearly over. I got *T. populeti* (four males), *T. instabilis* (one male), *T. stabilis* (three males and one female; one of the males was very pale). Dr. Corbett got about a similar number. The night was cold, and sky clear; wind quite cold, and due north. Mr. Clayton, the woodman, told us that *Brephos parthenias* had been on the wing early in March.

Mr. Potter and I visited the York locality on April 4th. As we were waiting for darkness, we found a nest of the long-eared owl with four eggs. We boxed nine *Lobophora lobulata*, males, in fine condition; these were at rest on birch trunks. Commenced operations at sallows about 8.30 p.m., and by 9.45 p.m. I had selected and boxed over one hundred and fifty moths from amongst a great number of specimens. Nearly one-third of the total were *T. munda;* there were also two *T. populeti*, males, eight *P. piniperda*, males; the remainder were commoner species. Night warm and cloudy; wind south-west. On our return journey, about 10.30 p.m., mounted on our bicycles, we noticed numerous glow-worms, glistening like diamonds, amidst the grass on the roadside; a very early date.

On April 6th Dr. Corbett and self proceeded to the sallows near York, and arrived on the ground about 8.10 p.m., commencing operations about 8.30 p.m. We shook twelve or fourteen fine trees, and had fair success at all of them. We found *T. stabilis* the most abundant moth of the evening, whilst *T. munda* was a good second; *stabilis* was in very fine condition, and varied much in ground colour, from pale ashy grey to light and dark ochreous forms; there were many pairs *in cop*. *T. cruda* was fairly common, and in good condition, and we noticed many pairs of this species, and also of *C. vaccinii*. *S.*

satellitia was by no means rare. Several *L. lobulata* and *H. progemmaria* also fell on to the sheet, as did one *G. libatrix*, the first I have ever noticed at sallows. Several examples of *T. populeti* were boxed, and these were mostly in good condition. *T. gothica* and *T. instabilis* were both common, and in good condition. Neither *satellitia*, *instabilis*, *populeti*, *gothica*, nor *piniperda* were taken *in cop.*; and although I have taken large numbers of the latter at sallows during the last twenty years, I have never yet seen a pair *in cop.* On this occasion we took a male *Selenia illunaria* on the wing. This evening will long be remembered by me as being that on which I took a male *stabilis* paired with a female *munda*. I called Dr. Corbett's attention to the singular occurrence before boxing the specimens. The female laid one hundred and sixty eggs, all of which proved fertile. Dr. Riding, of Honiton, and myself fed these larvæ on ash, oak, sallow, and birch, of all of which they ate freely. As might be expected, the larvæ closely resembled those of *T. munda*. About forty larvæ went down, and we are now anxiously awaiting the emergence of the moths. A specimen of *T. revayana* (a female) was also secured. This is a scarce species in Yorkshire.

In the evening of April 9th, about 7 p.m., I went off alone on my machine to Strensall, arriving there at 8 p.m. Night cold and clear, air rather frosty, and sky quite starlight; there was also a cold breeze blowing from due north. There were not many moths at the sallows, and very few fell into the sheet at each shake. Stayed out until about 9.30 p.m. I took *T. munda* (seven males and ten females), *T. populeti* (two females), *T. stabilis* (two males and four females), *C. vaccinii* (two females), *T. cruda* (three females, one of them a beautiful melanic form, the darkest I have ever seen), *T. gothica* (three females), *T. instabilis* (one female), *L. lobulata* (three males), *A. badiata* (one male). I kept most of the females for eggs. Many of the *T. munda* were worn; the sallows were getting over, some quite *passé*, others well into leaf. Left the wood about 9.50 p.m.

In company with Mr. B. H. Crabtree, I visited the York locality for sallows on April 10th, getting there about 8 p.m. Night cold and windy; wind due north, and quite strong, so strong indeed that it bent the tops of the most exposed sallow bushes, and large branches were swayed about by the breeze. The sallows, too, were about over. We took *P. piniperda* (one female), *T. rubricosa* (one male), *T. munda* (three males and seven females), *T. populeti* (seven males and one female), *T. stabilis* (three males and twelve females), *C. vaccinii* (a pair, *in cop.*, the only pair seen that night), *T. cruda* (four males and twelve females), *T. instabilis* (three males and seven females), *S. illunaria* (one male), *T. gothica* (one male and one female). Noticed a few *L. lobulata* and *H. progemmaria* on sheet. We shook some twelve bushes.

On April 18th sallow-bloom was nearly over; but on this, my last outing for 1896, I obtained, in the wood previously mentioned near York, *P. piniperda* (nine males and nine females in fair condition, some of them good), *T. instabilis* (two males and two females), *T. gothica* (one male and two females), *T. munda* (one female, very worn), *T. rubricosa* (two females in good condition). Saw a few *C. vaccinii*, but no *T. cruda*, *T. populeti*, or *T. gracilis*. Caught one *S. illunaria*,

female, in good condition; this had laid about fifty eggs by the 23rd. I noticed one example of *P. piniperda* flying round and alighting on the blossoms of the sallow about 3 p.m. in the broad sunlight; the sun just then was very hot, and shining full on the tree. Night warm, day very fine; wind south-west.

The commonest insect at sallows last season with me, at York, was *T. munda*, and I was struck by the extreme variation that occurred amongst the specimens taken. I have selected a beautiful series, from the year's captures, of sixteen males and twenty-four females for my own collection. *T. munda* will lay freely in a chip pill-box; the average number of eggs laid by one female about two hundred. The larvæ feed up readily on birch, sallow, elm, or oak; but the pupæ seem to have a strong objection to reveal their contents the following spring, at least such is my experience and that of several of my friends. Whilst on the subject of sallow moths, I might mention that I have noticed for many years how difficult it is to get specimens of *T. rubricosa*, *T. gracilis*, and *T. populeti*, to lay in captivity. Most of the sallows I am in the habit of working are *large* trees, generally situate on the outskirts of *small* plantations. An umbrella, even if of the dimensions of that used by King Coffee, would be far too small. I use two very long and very broad sheets, and then not unfrequently have to add to these two, three, or more copies of one of the London dailies to increase the spread. When all is ready below, I despatch my "Man Friday" up aloft, and then at a given signal he tickles the branches, and down come the moths. Occasionally the shaker is himself dislodged from the tree and drops on the sheet, but this only increases the fun, as it certainly does the danger.—William Hewett; Howard Street, York, November, 1896.

NOTES AND OBSERVATIONS.

High-flat Setting of Lepidoptera.—Although enough has, I think, been said on this subject, I beg to be allowed to say a few more words, in answer to Mr. Sabine's remarks (*ante*, p. 76). If he, as he says, thinks that it is well enough understood and unnecessary to mention, that low-setting is no guarantee against fraud, why then is this mode of setting still carried on? Further, if mites should not be known in a well-kept collection, they are, in spite of it, not an impossibility, even if introduced accidentally with specimens received in exchange; and as to Mr. Sabine's other remark that in no good collection do the insects touch the bottom of the drawer, I can assure him that I have seen very good collections indeed in which every specimen, without exception, *did* touch the bottom, and indeed this could scarcely have been otherwise, considering the small pins used. I am, however, glad to see that I receive some support from several other British entomologists in regard to the high-setting; and on the other hand, I should like to hear yet of the *advantage* of the English system, and why this should be still adhered to in opposition to the *entire rest of the world*, who surely must have found their system to

answer, as they all have adopted it. One more word. I fail to see why the peculiar setting in England should only be confined to the Lepidoptera: why do not collectors of other groups of British insects, or even ornithologists, adopt each a peculiar way of mounting their specimens to distinguish them from continental ones? say, for example, the bird collector might have all his birds stuffed with their beaks open or one eye shut, or the coleopterist might mount his beetles with the two hind legs raised in the air, &c., just to distinguish them from foreign specimens. But, joking aside, let everybody follow his own inclinations and taste in that respect; to me, personally, a collection of Lepidoptera with drooping wings looks, to say the least, untidy and poorly set.—M. Jacoby.

Agrotis ashworthii reared from Ova.—Having occasion to visit the Penmaenmawr locality for this beautiful insect, about the second week in July, I spent an hour looking over the most likely grounds. I only found one perfect insect, but saw several batches of ova. However, having learned from my experience of the previous season that there is a greater chance of success with a moderate number, I only took one batch. These hatched on July 18th, and numbered seventy-one. I tried to force them, feeding on sallow so long as it lasted. They made very slow progress, though kept in flower-pots on the kitchen mantelpiece. About thirty of the larvæ fed up before the others, and I had the satisfaction of knowing that twenty-four or twenty-five had gone down by the middle of October. The remainder, about thirty, absolutely refused to feed up, and gradually died off, being then only about half grown. On November 17th the first imago made its appearance, and between that date and Dec. 18th I had the pleasure of seeing twenty-five perfect specimens emerge. They vary slightly, some being very dark, others very pale, with intermediate forms. After the sallows were over I used knotgrass, groundsel, dock, plantain, and at the very last, lettuce. This latter food they ate freely, but it was rather too juicy for some of them, and they succumbed in the usual way. In my opinion the most successful method would be to procure ova as early as possible, and force slightly, so as to feed the larvæ up by the end of September at latest.—Robert Tait, Jun., 15, Rectory Road, Crumpsall.

Dragonflies of North London.—Apropos of the very interesting article on dragonflies in 1896, by Mr. W. J. Lucas (*ante*, pp. 29–36), a few remarks on the dragonflies of North London may possibly not be unacceptable; and though they are greatly inferior in number and variety to those recorded by Mr. Lucas as occurring in Surrey, yet I can remember the time, many years since, when they were more numerous than at present, and when it was an every-day sight to observe the natural economy of the Æschnidæ, and of *Libellula depressa* emerging from the pupa, on the rushes in a pond in my father's garden at Southgate. I have never enjoyed the same facilities of observation since, and doubtless several localities have been obliterated, and species have disappeared before the inroads of the universal builder.

Calopteryx.—Many years have elapsed since I last saw this genus

in Middlesex, and whether or no it still occurs in North London is more than I can say. But in past days *Calopteryx splendens* certainly was common (and I think *C. virgo* also) on the banks of the New River in the grounds of Amos Grove, Southgate. The course of that portion of the New River has since been diverted, and it no longer flows through my cousin's property. In those days, also, my father used to bring these dragonflies home after taking a walk by the River Lea. I believe one chief cause of my own attention being primarily directed to entomology was noticing the extreme beauty of a specimen of *C. splendens* that an old asthmatic spaniel of ours was holding between its paws.

Æschnidæ.—Anax imperator = formosus. An occasional visitor in North London. A solitary specimen was observed by a lady (then a neighbour of ours) two consecutive summers in St. Cuthbert's Road, which skirts the side of my residence. I did not see it myself; but the description which I received of its size, colour, and unusual appearance left no room for doubt that it was that species.—*Æschna cyanea.* Common in this neighbourhood. Specimens from Cricklewood, Dudden Hill, Kingsbury, Northwood, &c.—*Æ. grandis.* Not very common, and difficult to catch. Cricklewood and Pinner.—*Æ. juncea* and *Æ. mixta.* My impression is that one or other of these species used to frequent a pond many years since in the grounds of Amos Grove, Southgate; but I have not seen either of them lately, and have only a single British specimen of each in my collection.—*Brachytron pratense.* I once saw a solitary example, when the summer was well advanced, of what I am almost certain was this species, in Water Lane, Cricklewood. Under the impression that I had missed my stroke, I incautiously opened my net, when it immediately flew out, much to my dismay. Water Lane, now being rapidly surrounded by buildings on either side, no longer serves as a locality for the entomologist. My three examples of this species are from Basingstoke Canal, Byfleet.

Libellulidæ.—Libellula depressa. Common. Dudden Hill, Kingsbury, Cricklewood, ponds on Northwood Common. Often difficult to secure, from the fact of one of its favourite settling places being full length along a bramble spray.—*Sympetrum striolatum* (= *vulgatum*). Wanstead Park, Essex; Northwood Common; Dudden Hill, Cricklewood. —*Libellula quadrimaculata.* I think I have seen this species in Wanstead Park. I imagine it must also occur in this neighbourhood (*e.g.* Cricklewood, Kingsbury, Hendon, &c.), but I cannot speak positively as to having seen it myself here.

Agrionidæ.—Lestes sponsa. Dudden Hill; Wanstead Park, Essex. —*Pyrrhosoma minium.* Dudden Hill; Wanstead Park, Essex.—*Erythromma najas.* Wanstead Park, Essex. Of the four blue species of Agrionidæ, to wit, *elegans, cyathigerum, puella, pulchellum,* I believe I have all from the stretch of water in Wanstead Park, and that *elegans* and *pulchellum,* if not the remainder, occur at Dudden Hill; but I cannot speak positively as to the distinguishing marks of these species until carefully examined and pronounced on by an expert; as also my series of the same from Argyleshire and the New Forest.

So far as I am aware, in no one locality in the immediate North of London are so many dragonflies to be met with as in Wanstead Park —twelve kinds :—

Æschnidæ.—Æschna cyanea, Æ. grandis.

Libellulidæ. — Libellula depressa, L. quadrimaculata, Sympetrum vulgatum.

Agrionidæ.—Agrion pulchellum, A. puella, A. elegans, A. cyathigerum (probably all these number of individuals most abundant on flags and water-lily leaves), *Lestes sponsa, Erythromma najas, Pyrrhosoma minium. Erythromma najas* is very pugnacious, and chases away any other dragonfly that settles on the same water-lily leaf as itself.—(Rev.) F. A. Walker ; Dun Mallard, Cricklewood.

Parasites of Bombyx rubi, &c. (*ante*, p. 69).—Mr. Arkle has sent me specimens of *Apanteles difficilis*, Nees. Doubtless the parasite of *Arctia caia* was the closely allied *Apanteles caiæ*, Bouché. Mr. Arkle has also kindly sent me one of the cocoons of the heather-feeding sawfly, which I hope to breed. I find no sawfly with this food-plant in Cameron, André, Brischke, or Kaltenbach; the cocoon greatly resembles that of one of the Ophionidæ, being almost exactly like that of *Ophion luteum* or *Paniscus cephalotes*.—Edward A. Fitch ; Maldon.

The Diamond Jubilee.—It has been suggested to us that the lepidopterists of the British Islands should commemorate Her Majesty's long reign by forming a thoroughly representative collection of the butterflies and moths found in the United Kingdom, and presenting the same to the Natural History Museum at South Kensington. Possibly such a scheme may be considered too large an affair to undertake ; there is no reason, however, why an attempt should not be made to extend and improve the existing collection of British Lepidoptera in the Museum, which is certainly not as complete as it should be. If a committee were formed to work out the initial details, there is no doubt that any appeals for assistance in the shape of specimens would be liberally responded to. We shall be very pleased to have the views of our readers upon this subject.

CAPTURES AND FIELD REPORTS.

Acherontia atropos at Tenbury.—I was the recipient of a very fine pupa of *A. atropos*, sent me on Feb. 18th, by a lady residing in Tenbury. From her letter I understand that the perfect insect paid her beehives several visits in July and August, and in October three pupæ were unearthed in her garden. I have since followed the instructions for forcing given by Mr. G. F. Mathew (Entom. xxix. 328), the results of which I eagerly await.—H. W. Bell-Marley ; Ravenscourt Park, London.

Acherontia atropos in Suffolk.—I have not noticed amongst the many records of the capture of this insect in 1896 any from Suffolk, and I might say, though somewhat late, that two were taken in Ipswich ; one was in the public park. A friend who showed me the specimen mistook it for a piece of bark on the grass, and was about to give it a sharp blow with

his walking-stick, when the motion of the air caused it to move its wings. The larvæ have been found feeding in a potato field in the west end of the town.—CLAUDE A. PYETT; Waterloo Road, Ipswich.

CALLIMORPHA HERA, &c., AT DAWLISH.—Whilst staying at Dawlish for a fortnight, in the middle of August last year, my brother and I were fortunate enough to catch, amongst other things, six specimens of *C. hera*, three with red hind wings, two with orange, and one with yellow. We also saw another example with red hind wings, but failed to secure it. Three out of the seven seen were flying about, and the sun was shining brightly at the time. We also took one *Thecla betulæ* and a worn *Argynnis paphia*. *Pararge egeria* was very common in nearly all the lanes. We did no collecting at night.—C. E. BEDFORD; Murwance, Acton, W., March 1st.

EARLY APPEARANCES.—Throughout the past month (February) the weather, as far as this part of the country is concerned, has been remarkably mild and bright. On three separate occasions *Vespa vulgaris* was observed, and on one especially bright day a fine *V. crabro* (female) was noticed flying around a window, evidently enjoying its winter's flight. A few days later an hybernated *Vanessa urticæ* was observed resting on a gravel-path.—AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, March 4th, 1897.

Gonopteryx rhamni.—On Feb. 27th my brother noticed a *G. rhamni* flying in a street here.—C. E. BEDFORD; Acton, March 1st, 1897.

Phigalia pedaria (pilosaria).—My first capture of the season was a fine male *P. pilosaria*, which I found at rest on a lamp at Old Colwyn, when passing through on the evening of January 6th.—R. TAIT, JUN.; 15, Rectory Road, Crumpsall, Manchester.

ENTOMOLOGICAL EXPEDITION TO THE HIMALAYAS. — I am leaving England next week upon an entomological expedition to the Eastern Himalayas, and shall be glad if you will permit me to take this opportunity of informing correspondents that the whole of the specimens which I hope to obtain, with the exception of a series which I shall retain for my own collection, have already been disposed of.—W. HARCOURT-BATH; Birmingham, March 4th, 1897.

RECENT LITERATURE.

The Hemiptera-Homoptera (Cicadina and Psyllina) of the British Islands: a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, with Notes as to Localities, Habitats, &c. By JAMES EDWARDS, F.E.S. Pp. 261. Appendix, Index, and two plain plates. London: L. Reeve & Co. 1896.

THIS is a valuable addition to the series of excellent works on British Entomology published by Messrs. Reeve & Co.

In 1876, when the 'Catalogue of British Hymenoptera,' by Messrs. Douglas and Scott, was produced, the number of species then known to occur in these islands was 268; at the present time our author finds that the number does not exceed 307, and four of these are now described as new. "The least satisfactory feature of this work is, probably, the record of localities; but the meagre nature of this arises

from a cause quite beyond the control of the author, to wit, the paucity of collectors of these insects." Now that we have a thoroughly trustworthy work on Hemiptera-Homoptera to aid us in identification, we may reasonably anticipate not only that considerable additions will be made to our knowledge of the distribution, within our limits, of the known species, but that species new to the list may also be detected.

A large-paper edition, with twenty-eight coloured plates, is also published.

The Lepidoptera of the British Islands: a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, their Preparatory Stages, Habits, and Localities. By CHARLES G. BARRETT, F.E.S. Vol. iii., pp. 396. London: L. Reeve & Co. 1896.

THIS volume treats of the Bombycidæ, commencing with family ten, and a part of the Noctuæ. Altogether thirty-three genera and ninety-nine species are dealt with.

Economic Entomology for the Farmer and Fruit-grower, and for Use as a Text-book in Agricultural Schools and Colleges. By JOHN B. SMITH. Pp. 481. Philadelphia: J. B. Lippincott Company. 1896.

ALTHOUGH this liberally illustrated text-book is intended more especially for American students, it contains much that will interest British entomologists.

Proceedings of the Eighth Annual Meeting of the Association of Economic Entomologists. (Bulletin No. 6. New Series. U.S. Department of Agriculture. Division of Entomology.) Washington. 1896.

Bibliography of the More Important Contributions to American Economic Entomology. By SAMUEL HENSHAW. Pt. v. L–Z. Pp. 179. (U.S. Department of Agriculture. Division of Entomology.) Washington. 1896.

OBITUARY.

WE hear with regret of the death of Mr. J. B. HODGKINSON, of Ashton-on-Ribble, which took place at about the end of February last. He was an untiring collector, and a frequent contributor of notes on field work, &c., to the entomological magazines from 1856 to a quite recent date. He first obtained *Cidaria reticulata* in 1856, but the identity of the species was not discovered until 1861, and no other examples were found in the Lakes District until 1876. In 1877 he reared this insect from larvæ, and the following year he bred *Penthina postremana*. He was especially successful in his work among the Micro-Lepidoptera, and added several species to our list, some of which were new to science. Mr. Hodgkinson was elected a Fellow of the Entomological Society of London in 1890.

THE ENTOMOLOGIST

Vol. XXX.] MAY, 1897. [No. 408.

ANISOLABIS ANNULIPES, Lucas.

By W. J. Lucas, B.A.

On April 5th last I received from Mr. G. Nicholson, of Kew Gardens, two living specimens of *Anisolabis annulipes*, an insect having a wide range, but inhabiting somewhat warmer countries than our own. Both specimens were females. They reached England in odd rubbish that was packed around some orchids and other plants that had come to the Gardens from Ootacamund, in the Presidency of Madras. A few days later Mr. Nicholson forwarded me, in spirit, another specimen, a very

small one, though apparently of the same species, which had arrived in this country in sugar-cane from Mauritius in August, 1894. Kew, therefore, constitutes the second locality (if locality it may be called) for this earwig in England. The first was at Tavistock, in Devon, where, in 1894, Mr. H. Swale discovered the species in an old baker's shop* in large numbers among the ashes under the furnace. They had their nests in the crevices of the pillars that supported the oven and in the floor. He made out that they were first observed about 1885, and as they were still there last year the colony is evidently well established. As, however, the home of this earwig is in the Mediterranean countries, Africa, Central and South America, Southern Asia, &c., it is hardly likely to permanently take up its abode here, at any rate out of doors.

Anisolabis annulipes is shining black in colour, with a yellowish lateral margin to pronotum. Antennæ of sixteen joints, the three basal ones being reddish, the next eight very dark with lighter apex and base, the next two white, and the last three again dark. Elytra and wings are both absent. The forceps are short and stout, without teeth, but with slightly wrinkled inner margin: in the male the right leg of forceps is more incurved at the point than the left. There are thirteen divisions to the body of the male and eleven to that of the female, the first three forming the thorax, the next nine and seven respectively the abdomen, while the last or anal one bears the forceps. The flattened legs are pale yellow in colour with a dark band round the middle of the femora and another at the base of the tibiæ. Length of male, including forceps, 12 mm.; of female, 15 mm. The specimen figured is a female.

21, Knight's Park, Kingston-on-Thames, April 12th, 1897.

LEUCTINODES VAGANS.

Aphytoceros vagans, Tutt, Ent. Rec. i. p. 203 (1890).
Leuctinodes longipalpis, Warren, Ann. & Mag. Nat. Hist. (6) ix. p. 391 (1892).

Although made known to science through the capture of a specimen at Chepstow, this species of the Pyralidæ cannot be regarded as British. Warren's type of *L. longipalpis*, in the National Collection at South Kensington, is from the Transvaal, and Sir George Hampson, who has seen the Chepstow type and compared it with the African one, is of opinion that both insects are specifically identical.—R. S.

* Ent. Mo. Mag. 1894, p, 124.

MELANISM AND CLIMATAL CONDITIONS.

By G. W. Smith.

Mr. Harcourt-Bath enters upon this subject (*ante*, p. 97), and contributes some new suggestions as to the origin of melanism in Rhopalocera. He has omitted, however, to take into account the melanic tendencies exhibited by certain British insects inhabiting the environs of our manufacturing towns, and which have been reported to have perceptibly increased during the last fifty years. In the celebrated melanism controversy of 1893, there was only one theory satisfactorily condemned with reference to this particular form of melanism, namely, that of moisture increasing melanic tendencies in insects; such a view being refuted by the presence of light-coloured species, such as *Macrogaster arundinis*, *Lithosia muscerda*, &c., in especially marshy districts. We may therefore disregard this idea altogether. It was at that time proved by Lord Walsingham that dark-coloured species were benefited in the struggle for existence by being able to take advantage of intermittent gleams of sunshine; and Mr. Robson wrote, "At present we may confidently assert that whatever impedes the direct rays of the sun has a tendency to create melanic forms in Lepidoptera." I think perhaps Mr. Bath has mistaken what he terms the old-fashioned ideas on melanism; for no one has supposed, since Lord Walsingham's theory, that the absence of sunshine has the direct physiological effect of producing dark coloration: it was generally accepted, according to that theory, that melanic varieties of light-coloured species survived through the agency of natural selection by reason of their being able to take advantage of broken, changeable weather.

I may here mention Mr. Birchall's view, which appeared before Lord Walsingham's and resembled the latter in principle: "As it appears certain that greater strength of constitution and more powerful and acute perceptive faculties are, from some yet unknown cause, associated with dark colours in the Vertebrata, may we not presume that insects are subject to the same law, and that dark varieties of Lepidoptera are able to spread and increase under adverse conditions, whilst the lighter coloured types fail to do so, and are consequently eliminated in the struggle for life, and that the occurrence of melanic forms may be thus reasonably explained as a simple case of the survival of the fittest."

Mr. Jenner Weir also, speaking before the London Entomological Society, said: "In the mountains of Switzerland and the Tyrol the clearness of the atmosphere was nearly as great (as in the lowlands of Italy, Spain, &c.), but constantly interrupted by dense mists and clouds, and it is precisely in these

altitudes that melanism becomes the rule rather than the exception; many of the topomorphic varieties are melanic, and many of the Alpine species are very dark; *Pieris napi* var. *bryoniæ* may be given as an example of the former, and the males of *Melitæa cynthia* of the latter. This uncertain condition of the weather is characteristic of the climate of the British Isles. The result is that our indigenous Lepidoptera are, as a rule, darker in colour than the continental, and the tendency to melanism increases northwards, till it may be said to culminate in the Shetlands."

I cannot see the force of objections based on the existence of such "zanthochroic" forms as *P. apollo*, *P. delius*, &c., at high levels in the Alps and Pyrenees. One law is not necessarily universal for all species, especially when they belong to different groups.

Mr. Harcourt-Bath has no doubt pointed out a *vera causa* in the preponderance of organic over physical environments, but his theory must not be pushed too far. He cannot disregard physical environment as a factor in the origin of melanism in the light of the increased melanic tendencies in insects inhabiting districts neighbouring on our manufacturing towns, and the views expressed upon this tendency. The melanism controversy of 1893 is conveniently summarized in 'The British Naturalist' for 1893, pp. 61–71.

College, Winchester, April, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 107.)

Tephrosia punctularia, *Hb.*—Nowhere at all plentiful. Wicklow (Tinahely, *Bw.*) and Kerry (*B.*); Mucross and the Upper Lake of Killarney; Clonbrock, Co. Galway, scarce. Some specimens from this locality have the spots very large on a clear whitish ground, so that they have a superficial resemblance to *Cleora glabraria*.

Gnophos obscuraria, *Hb.*—Widely spread along the Irish coast, and often very abundant; but scarce inland at the few localities it has been reported from, namely Mallow, Co. Cork (*Stawell*); Clonbrock (*R. E. D.*) and Recess, Co. Galway. I have seen no black forms, nor any of the pale chalk varieties. Those at Howth are as light as any Irish examples I have met with. At Minehead, Co. Waterford; Clogher Head, Louth; and Newcastle, Co. Down, they are somewhat darker in tone.

[*Dasydia obfuscaria*, Hb.—Erroneously listed by Birchall as

having been taken by Mr. Bristow in Wicklow. A subsequent record in the 'Entomologist' of 1867, p. 251, has not been confirmed by subsequent capture.]

PSEUDOTERPNA PRUINATA, *Hufn.*—Generally distributed, and abundant.

GEOMETRA PAPILIONARIA, *L.*—Throughout Ireland, but usually scarce. Not very uncommon about Killarney, Kenmare, and Glengariff, Co. Kerry; and Mallow, Co. Cork (*Stawell*); New Ross, Wexford (*B. H.*); Clonbrock (*R. E. D.*) and Oughterard (*Halbert*), Co. Galway; Wicklow (*B.*); Killiney (*S.*) and Rathfarnham, Co. Dublin; Castle Bellingham (*Thornhill*); Drumreaske, Co. Monaghan; Farnham, Cavan; Enniskillen (*Partridge*) and Belleisle, Co. Fermanagh; Maghery, L. Neagh (*J.*); Cromlyn (*Mrs. B.*), Westmeath.

GEOMETRA VERNARIA, *Hb.*—Birchall's Wicklow record must be deleted. One specimen was taken on a wall in Eccles Street, Dublin, by the late well-known entomologist S. R. Fetherstonhaugh, Esq.; perhaps introduced accidentally on an imported plant of *Clematis vitalba*.

IODIS LACTEARIA, *L.*—Common in woods throughout Ireland.

HEMITHEA STRIGATA, *Müll.*—Scarce. Curiously enough it is usually reported as *Nemoria viridata* by beginners, which insect has not yet been taken in Ireland. Single examples for the most part have occurred as follows:—Ardara, Co. Donegal (*J.*); Knocknarea, near Sligo (*R.*); Ardrahan (*Miss N.*), Moycullen (*Miss R.*), Clonbrock (*R. E. D.*), and near Galway (*A.*); Athlone (*Willcox*) and the Tipperary shore of L. Derg; Farnham, Cavan; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Co. Westmeath; Cappagh, Co. Waterford (*Miss V.*); Ballinadee Rectory (*L.*), Drimoleague (*D.*) and Cork (*S.*); Kenmare, Co. Kerry; Greystones, Co. Wicklow.

ZONOSOMA PUNCTARIA, *L.*—One example taken by Mr. Dillon and one by myself at Clonbrock, Co. Galway.

ZONOSOMA LINEARIA, *Hb.*—Three at Clonbrock, Co. Galway (*R. E. D.*).

ZONOSOMA ORBICULARIA, *Hb.*—Occurs sparingly at Clonbrock (*R. E. D.*).

ZONOSOMA PENDULARIA, *Clerck.*—Local, and sometimes fairly abundant. Irish specimens are unusually richly tinged with rose colour when fresh. Co. Wicklow (*B.*); Cookesborough near Mullingar (*Miss R.*); Clonbrock (*G. V. H.*), Ardrahan, fairly numerous; Co. Galway; also at Favour Royal and Altadiawal, Co. Tyrone; Killarney (*W.*).

HYRIA MURICATA, *Hufn.*—Said by Birchall to be common on the heaths of the south and west. I have never met with a

specimen. A few have occurred at Clonbrock, Co. Galway, of the Lancashire type.

ASTHENA CANDIDATA, *Schiff.*—A very local species. Powerscourt, one by Prof. Hart. At Ardrahan and at Merlin Park near Galway it occurs in certain spots not uncommonly.

ASTHENA SYLVATA, *Hb.*—Scarce. Powerscourt, one (*G. V. H.*); and it is recorded by Birchall also from Co. Wicklow. In Co. Galway it occurs at Ardrahan, Kilcornan, Merlin Park, Clonbrock (*R. E. D.*), and near Galway (*A.*); Markree Castle, Co. Sligo; and Killarney.

VENUSIA CAMBRICA, *Curt.*—Powerscourt, Co. Wicklow (*B.*); Howth, a curious variety, with lineolate markings and few spots, taken by Prof. Hart; Favour Royal and Altadiawal, Co. Tyrone; L. Gill (*R.*) and Markree Castle, Co. Sligo; near Derry (*C.*); Newcastle, Co. Down (*W.*); Clonbrock, Co. Galway, one (*R. E. D.*); Westport, Co. Mayo (*W.*); Killarney.

ACIDALIA DIMIDIATA, *Hufn.*—Often very abundant, and widely spread.

ACIDALIA BISETATA, *Hufn.*—Everywhere common. Var. *fimbriolata* occasionally occurs, and is very often reported as *A. trigeminata.* I believe Birchall's record of the latter has thus crept into the Irish list by mistake.

ACIDALIA RUSTICATA, *Fb.*—Two or three at Clonbrock, Co. Galway (*R. E. D.*).

ACIDALIA VIRGULARIA, *Hb.*—Mr. Birchall's record of this as common has always been a puzzle to me. One example at Clonbrock, by Mr. Dillon. I have also a statement that it has occurred at Killiney, Co. Dublin, but I have seen no specimens.

ACIDALIA ORNATA, *Scop.*—Mr. Dillon reports the capture of a few at Clonbrock, Co. Galway.

ACIDALIA MARGINEPUNCTATA, *Göze.*—Widely distributed on the coast line, and often numerous. Rarely occurs inland. All the examples I have seen are either of a dingy fuscous grey scarcely spotted, or of a speckled grey, with deeply-shaded marginal bands and large spots. Up to the present I have seen no approach to the light grey Eastbourne forms. The grey limestone coasts of Clare may perhaps produce pale variations. This species sometimes comes to sugar. The second brood does not seem to vary from the first. The following are a few of the localities where it is more or less plentiful:—Howth; Malahide; Bray Head; Arklow; Old Head of Kinsale; Dunmore; Ballycottin Bay; the coast of Kerry generally; Clonbrock, one; Merlin Park near Galway; Kilkeel, Co. Down (*W.*); &c.

ACIDALIA SUBSERICEATA, *Haw.*—I have very little knowledge of the distribution of this species. It is very common at Howth,

and at Tramore, Co. Waterford; Clonbrock, one (*R. E. D.*), Co. Galway.

ACIDALIA IMMUTATA, *L.*—Common in many places, and widely distributed. Castle Bellingham (*G. V. H.*); Killynon, Westmeath (*Miss R.*); Toberdaly, King's Co.; Knocknarea, Sligo (*R.*); Moycullen (*Miss R.*), Leenane, Recess, and Clonbrock, Co. Galway; Glengariff and Killarney, common; Minehead and Cappagh, Co. Waterford.

(To be continued.)

ON THE GENUS *GYMNOPLEURUS*, ILLIGER; WITH A LIST OF SPECIES AND DESCRIPTIONS OF TWO NEW GENERA.

BY JOHN W. SHIPP.

(Continued from p. 66.)

[ORIENTAL REGION.]

65. *cyaneus*, Fab., Ent. Syst. Suppl. p. 34; Macleay, Horæ Ent. p. 515.
    Tranquebar.
66. *granulatus*, Fab., Ent. Syst. i. p. 65, 1792; Macleay, Horæ Ent. p. 516.
    = *dejeani*, Cast., Hist. Nat. ii. p. 70; Westerman, Dej., Cat. 3 ed. p. 150.
    = *gemmatus*, Har., Col. Hefte viii. p. 117.
    = *kœnigi*, Donovan, Ins. t. 2, f. 3.
    India or.; Pondicherry.
67. *impressus*, Cast., Hist. Nat. ii. p. 73.
    indicus, var., Cast., *l. c.*, p. 73 (note).
    India or.
68. *indicus*, Cast., Hist. Nat. ii. p. 73.
    eximus, Dej., Cat. 3 ed. p. 151.
    India or.
69. *kœnigi*, Fab., Ent. Syst. i. p. 65; Macleay, Horæ Ent. p. 515; Don., Epit. Ins. Ind. 1800.
    = *guttatus*, Lin., Gmel. ed. 1, i. p. 1558 (Mongolia).
    = *scriptus*, Pall., Icon. p. 7, t. A, f. 7 (Tartary).
    India or.; Mongolia.
70. *lacunosus*, Klug., Symb. Phys. v. t. 41, f. 5.
    Arabia.
71. *maculosus*, Macleay, Horæ Ent. i. 2, 1821, p. 517.
    = *bengalensis*, Gory MS.
    = *exanthema*, Wied., Zool. Mag. ii. 1823, p. 22.
    India or.; Bengal.
72. *melanarius*, Har., Col. Hefte i. 1867, p. 76.
    Java; Sumatra.

73. *miliaris*, Fab., Mant. Ins. i. p. 17; Oliv., Ent. i. 3, p. 167, t. 18, f. 164; Ent. Syst. Suppl. p. 817.
India or.
74. *mundus*, Wied., Zool. Mag. i. 3, 1819, p. 162.
= *capicola*, Cast., Hist. Nat. ii. p. 70, 1840.
India or.; China.
75. *opacus*, Redt., Hügel Kaschm. iv. 2, p. 516.
= *wiedemanni*, Dej. MS.
Himalaya Mountains; India or.
76. *parvus*, Macleay, Horæ Ent. p. 517.
India or.
77. *ruficornis*, Mots., Etud. Ent. iii. p. 63.
Shanghai.
78. *sinuatus*, Oliv., Ent. i. 3, p. 160, t. 21, f. 189; Fabr., Syst. El. i. p. 60.
= *leei*, Donovan, Chin. Ins. t. i. f. 4.
China; Java.
79. *smaragdifer*, Walk., Ann. Mag. Nat. Hist. 3rd ser. ii. 1858, p. 208.
Ceylon.
80. *spilotus*, Macleay, Horæ Ent. i. 2, p. 517.
= *scabrosus*, Dej. Cat. 3 ed. p. 150.
India or.; Java.
81. *sumptuosus*, Cast., Hist. Nat. ii. p. 71.
India or.
82. *morosus*, Fairm., Ann. Soc. Ent. Fr. (6) vi. p. 319.
var. of *sinuatus*, Bates, Ent. xxiv. Suppl. p. 73.
Yunnan.
83. *inconspicuus*, Waterh., Ann. Mag. Nat. Hist. (6) v. 1890, p. 371.
E. India; N. W. India (Mhow).
84. *subtilis*, Waterh., Ann. Mag. Nat. Hist. (6) v. 1890, p. 371.
E. India; N. India.
85. *hornei*, Waterh., Ann. Mag. Nat. Hist. (6) vi. 1890, p. 410.
India.
86. *singularis*, Waterh., Ann. Mag. Nat. Hist. (6) vi. 1890, p 410.
Corea.
87. *assamensis*, Waterh., Ann. Mag Nat. Hist (6) vi. 1890, p. 411.
India.
88. *brahminus*, Waterh., Ann. Mag. Nat. Hist. (6) vi. 1890, p. 411.
China.
89. *striatus*, Sharp, Col. Hefte xiii. p. 33, 1875.
Singapore.
90. *æthiops*, Sharp, Col. Hefte xiii. p. 34, 1875.
Rangoon.
91. *planus*, Sharp, Col. Hefte xiii. p. 35.
Penang.
92. *stipes*, Sharp, Col. Hefte xiii. p. 35.
Philippine Islands.

93. *calcar*, Sharp, Col. Hefte xiii. p. 36; Har., Deutsch. Ent. Zeit. 1877, p. 39.
♀ = *dubius*, Sharp, Col. Hefte xiii. p. 36.
Celebes; Menado.
94. *celebicus*, Sharp, Col. Hefte xiii. p. 37.
Celebes.
95. *rudis*, Sharp, Col. Hefte xiii. p. 37.
Lombok.
96. *sparsus*, Sharp, Col. Hefte xiii. p. 38.
Borneo.
97. *productus*, Sharp, Col. Hefte xiii. p. 38.
Laos.
98. *maurus*, Sharp, Col. Hefte xiii. p. 34; Har., Deutsch. Ent. Zeit. 1877, p. 38.
Borneo; Sarawak.
99. *abax*, Sharp, Col. Hefte xiii. p. 39.
Cambodia.

[PALÆARCTIC REGION.]

100. *aciculatus*, Gebler, Bull. Ac. Petr. viii. 1841, p. 372; Bull. Mosc. 1859, p. 465 (329); Reitter, Ver. Nat. Vereines Brunn, xxxi. p. 164 (43), 1892.
= *violaceus*, Ballion, Bull. Mosc. xliii. 1890, p. 331.
Lenkoran; Transcaspian Region; Turkestan; Kirgishia.
101. *cantharus*, Erichson, Ins. Nat. iii. p. 757; Reitter, Ver. Nat. Vereines Brunn, xxxi. p. 164 (43).
var. *cyanescens*, Mots., Bull. Mosc. 1849, iii. p. 101.
Turkestan; S. Europe; Algeria; Syria; Kleinasien; Caucasus.
102. *flagellatus*, Fabr., Syst. Ent. i. p. 29, 1775; Mant. Ins. i. p. 17 (1787); Fabr., Syst. El. i. p. 59 (1801); Fabr., Ent. Syst. i. p. 66 (1792); Gmel., Linn. Syst. Nat. i. 4, 1555, 226; Oliv., Ent. i. 3, pp. 162, 199, pl. 7, f. 51, *a*, *b*; Oliv., Trad. allem. i. p. 101, pl. 47, f. 10, 11; Macleay, Horæ Ent. ed. Leq. p. 60; Oliv., Encycl. Meth. 5, p. 174; Dumeril, Dict. des Sc. Nat. v. p. 281; Latr., Hist. Nat. x. p. 97; Latr., Gen. des Crust. et Ins. 2, p. 78; Band., Laf. Monogr. p. 46; Suckow, Naturf. p. 212; Fischer, Entom. i. p. 144, pl. 13, f. 4; Illiger, Mag. ii. p. 202; Boit., Man. i. p. 315; Casteln., Hist. Nat. ii. p. 72; Muls., Col. Fr. Lamell. pp. 57, 58; Reitter, Ver. Nat. Vereines, Brunn, xxxi. 1892, p. 164.
= *coriarius*, Herbst, Kafer. ii. p. 309, t. 20, f. 4.
= *scabratus*, Fabr., Ent. Syst. iv. app. p. 436.
= *stictopterus*, Linn., ed. Gmel. i. 4, p. 1558.
var. *asperatus*, Muls., Col. Fr. Lamell. p. 58; Mots., Bull. Mosc. 1849, iii. p. 103; Stevens, Dej. Cat. 3 ed. p. 150.

var. *clypeolatus*, Muls., Col. Fr. Lamell. p. 58.
var. *conflagratus*, Mots., Bull. Mosc. 1849, iii. p. 102.
var. *confusus*, Muls., Col. Fr. Lamell. p. 58.
var. *cribellatus*, Mots., Bull Mosc. 1849, iii. p. 102.
var. *rugulosus*, Muls., Col. Fr. Lamell. p. 58.
var. *serratus*, Fischer, Lettr. à Pand. 1821, p. 11; Ent. Russ. i. p. 145, t. 13, f. 5.
var. *suturalis*, Mulls., Col. Fr. Lamell. p. 58.
var. *variolosus*, Mots., Bull. Mosc. 1849, iii. p. 102.
Mediterranean Region; France, Basses Alpes; Syria; Caucasus; Transcaspian Region; Turkestan; Siberia; West China; North Africa.

103. *geofroæ*, Fuess., Verz. Schweiz. Ins. 1775, p. 2, 14.
= *geoffroæ*, Sulz., Abgek. Gesch. p. 18, pl. i. f. 7; Panz. Symb. Ent. pl. 5, f. 5, 6, 7, 8; Panz., Ent. Germ. p. 18.
(*geoffroæ*), Rossi, Faun. Etr. i. p. 15; Rossi, ed. Helw. i. p. 16; Ponza, Coleop. Salut. p. 22; Scriba, Journ. i. p. 54, 1790; Brahm., Rhein. Mag. p. 693.
(*geoffroyi*), Sturm., Verz. i. p. 78, pl. 3 (♂); Har. Col. Hefte vii. p. 113.
(*geoffroy*), Duftsch., Faun. Austr. i p. 161 (♂); Fischer, Ent. Russ. i. p. 142, t. 13, f. 3.
= *pilularis*, Fab., Ent. Syst. i. p. 67, 1792; Fab.. Syst. El. i. p. 60; Herbst., Kafer. ii. p. 311, t. 20, f. 5; Sturm., Deutsch. Ins. i. p. 74, 1, t. 4, f. 5; De Vill., C. Lin. Ent. i. p. 22; Schnied., Mag. i, p. 346; Preyssl., Bœmisch. Ins. i. p. 46; Romer, Gen. Ins. pl. 1, f. 7; Macleay, Horæ Ent. ed. Leq. p. 59, ♂; Oliv., Encycl. Meth. v. p. 174; Schäff., Icon. i. pl. 3, 7; Harrer, Besch. p. 34; Dumeril, Dict. des Sc. Nat. v. p. 281; Muls., Lett. i. p. 284; Panz., Schäff. Icon. p. 5; Walcknær, Faun. Par. i. p. 9; Latr., Hist. Nat. xvi. p. 96; Latr., Nouv. Dict. d'Hist. Nat. iii. p. 51; Band., Laf. Monogr. p. 47; Suckow, Naturg. p. 214; Sturm., Deutsch. Ins. Faun. p. 74, p. 11 (♂ det.); Boit., Man. i. p. 314; Casteln., Hist. Nat. ii. p. 70, pl. 4, f. 2, ♂; Muls., Col. Fr. Lamell. pp. 54, 55; Reitter, Ver. Nat. Vereines Brunn, xxxi. 1892, p. 163.
= *mopsus*, Pallas, Icon. 1781, p. 3, t. A, f. 3; Erichs., Ins. Nat. iii. p. 755, 1848.
= *cantharus*, Illiger, Mag. ii. p. 201, 1823.
= *sinuatus*, Fourc., Ent. Paris, i. p. 15.
= *subcyaneus*, Brulle, Exp. Mor. p. ?
var. *atratulus*, Mots., Bull. Mosc. 1849, iii. p. 100.
var. *bidentatus*, Muls., Col. Fr. Lamell. p. 55.
var. *dorsalis*, Muls., *l. c.*

var. *glabriusculus*, Muls., *l. c.*
var. *indistinctus*, Muls., *l. c.*
var. *lævifrons*, Muls., *l. c.*
var. *læviusculus*, Muls., *l. c.*
var. *tuberculatus*, Muls., *l. c.*
var. *obtusus*, Muls. & Rey, Ann. Soc. Ag. Lyons (4), ii. p. 298. (Basses Alps).

Mediterranea Region (Gibraltar, Malta, Sicily, Spain, France, Italy, Greece, Algeria, Morocco, &c.; Austria; Bohemia; S. Germany; Caucasus; Turkestan; Transcaspian Region.

104. *janthinus*, Cast., Hist. Nat. ii. p. 71.

Barbary.

105. *sturmi*, Macleay, Horæ Ent. ii. p. 512; Macleay, Horæ Ent. ed. Leq. p. 59, ♀; Erichs., Nat. Ins. iii. p. 758, 1848.

= *pilularis*, Sturm, Verz. i. p. 79.
= *cantharus*, Dufts., Faun. Austr. i. p. 162.
= *convexiusculus*, Mots., Bull. Mosc. 1849, iii. p. 101.
= *atronitidus*, Macleay, Horæ Ent. ii. p. 513.

Mediterranean Region; Syria; Algeria; Spain; Austria; Siebenbergen.

Gymnopleurus. Habits, &c., noticed—Lucas, Bull. Soc. Ent. Fr. (6) i. pp. lviii, lix.

(To be continued.)

NEW HYMENOPTERA FROM NEW MEXICO, U.S.A.

By T. D. A. Cockerell.

PHILANTHIDÆ.

Cerceris acanthophilus, n. sp.

♂. Length about 8 mm., black, with light yellow markings, closely punctured all over, the punctures very large, so as to produce a subcancellate effect. Pubescence silvery, but very sparse, only conspicuous on lower part of face. The light yellow markings (on face nearly white) are as follows:—All of clypeus, except anterior edge, supraclypeal mark pointed above; lateral face marks occupying all the area between clypeus and eye, and extending upwards, gradually narrowing to an abrupt broad ending on orbital margin, a short distance above level of antennæ; mandibles, except the dark rufous ends; scape, except a dark patch at end above; a broad but interrupted band on prothorax (but not tubercles); tegulæ, except the hind margin; a pair of widely-separated spots on scutellum, postscutellum, distal ends of femora, first four tibiæ entirely, basal three-fifths of hind tibiæ, tarsi (becoming slightly rufous towards ends), two small spots close together on first abdominal segment, and

continuous bands on segments 2 to 6. Clypeus slightly convex, the lateral portions separated by a notch, which appears as a small black spot. Base of mandibles overlapped by a brush of hairs. Scape short and stout, somewhat curved; flagellum pale rufous beneath, first joint about one-fifth longer than the second. Tegulæ with a hyaline margin. Wings hyaline, apex strongly fuliginous, nervures and stigma black. First abdominal segment subglobose, a little longer than broad; second very similar to those following. Apex and venter entirely black. The anterior edge of the clypeus is black, and feebly tridentate.

Hab.—Deming, N. M., in numbers flying round a bush of *Zizyphus lycioides*, July 9th, 1896. I cannot identify this with any described species; and Mr. Fox, after comparing it with the collections at Philadelphia, writes, "apparently distinct from any here." It would seem to be near *C. finitima*, Cr., from Illinois; but it differs in colour of stigma, absence of spot behind eyes, and has more yellow on the prothorax. Among the N. M. species it is recognised by the black and yellow legs and abdomen, without any ferruginous, the absence of spots on vertex, the spotted scutellum, the supraclypeal mark, and the first abdominal segment not elongate. Specimens have been sent to Amer. Ent. Soc. and U. S. Natl. Mus.

I have before me other examples of *C. acanthophilus*, with the following data. Four at flowers of *Solidago canadensis*, Las Cruces, N. M., August 24th and 26th. Two on flowers of *Boerhaavia erecta*, Las Cruces, August 23rd. They show remarkable variation in size; the smallest (from *Boerhaavia*), 6 mm.; the largest (from *Solidago*), 9½ mm. The markings are constant, except that the 6 mm. example has a band (instead of two spots) on first abdominal segment.

EUCERCERIS VITTATIFRONS, *Cresson*, var. TRICOLOR, v. nov.

♂. Length, 10 mm. Black, with yellow, cream-colour, and rufous markings. Face pale lemon-yellow, with two black stripes; an oval yellow patch behind upper part of eye; hind margin of prothorax with tubercles, large patch on upper part of pleura, two large pear-shaped transverse patches on scutellum, postscutellum, and large patch on side of metathorax, cream-colour. Tegulæ cream-colour, with a small basal spot and the hind third shining rufo-fulvous. Wings hyaline, marginal cell and apex fuliginous; stigma fuscous. Legs ferruginous, coxæ and first four femora behind blackened; a large patch on first four femora, and stripe on first four tibiæ, shining cream-colour. Abdomen black, with six entire cream-coloured bands, *the first two segments ferruginous.*

Hab.—Las Cruces, N. M., August 5th (C. H. T. Townsend).

PEMPHREDONIDÆ.

SPILOMENA FOXII, n. sp.

♀. Length about 3 mm.; entirely black, except that the scape is orange near the end on one side, the funicle is orange on one side, the

knees, tibiæ at ends (front tibiæ almost entirely), and tarsi are orange. Wings hyaline, beautifully iridescent, nervures brown, stigma very large, dark vandyke-brown. Vertex shining, with distinct sparse punctures, ocelli in rather a high triangle, distance between the hind ones not so great as that between one of them and the eye. Mesothorax and scutellum rather dull, with a minute subtessellate sculpture. Abdomen smooth and shining. A compound microscope shows a minute lineolate sculpture on the cheeks, and a sparse extremely short white pubescence on the dorsulum. The lineolate sculpture is also seen on the sides of the face, above the antennæ, accompanied by very sparse punctures; also on the venter of the abdomen, where it runs into a minute tessellation. Flagellum finely pubescent.

Hab.—Santa Fé, N. M., July 5th, in Mr. Boyle's garden, on or about the foliage of an apricot tree (Ckll. 3322). Named after Mr. W. J. Fox, the monographer of the N. Amer. Pemphredonidæ, who first recognised it as distinct. A second species of *Spilomena*, taken at Santa Fé on July 29th, differs at once by the orange antennæ, tegulæ, and entirely orange legs.

MUTILLIDÆ.

Photopsis mesillensis, n. sp.

♂. Length about 7 mm.; head (except black eyes and ocellar region), thorax, and first abdominal segment ferruginous, remainder of abdomen, except the fuscous apex, shining black. All these parts very sparsely clothed with long pale glittering hairs, densest and most conspicuous on the abdomen. Antennæ rufo-testaceous; legs very pale ochreous, the middle and hind femora more or less infuscated. Head small and round, eyes very prominent; mandibles dark at tips, their outer margin with a prominent tubercle or blunt tooth some distance from the base. Vertex with strong very sparse punctures. Antennæ long, first joint of flagellum about two-thirds length of second. Tegulæ testaceous. Mesothorax with strong very sparse punctures; metathorax coarsely reticulate, convex, not abruptly truncate. Middle tibia with two spurs. Wings dull hyaline, minutely hairy, stigma fuscous, nervures almost colourless; two submarginal cells and one recurrent nervure, which joins the second submarginal at about one-third from its base; first submarginal narrow, second large and subtriangular; marginal cell with its poststigmatal portion about as long as stigma, its tip not truncate, though blunt. About two-thirds of stigma included in marginal cell. Petiole joint long and narrow, its suture with the second constricted above. In certain lights the hind margins of the abdominal segments appear narrowly shining testaceous. Apex with two spines.

Hab.—Mesilla, N. M., at light, July 30th, 1896. In colour this resembles *C. nigriventris*, Fox, from Lower California, but that is much larger, and otherwise different.

APIDÆ.

Melissodes menuacha, *Cresson*, var. submenuacha, v. nov.

♂. Length about 13 mm.; antennæ, 9½ mm. Mandibles black, without any yellow spot. Nervures dark.

Hab.—Las Cruces, N. M., at flowers of *Helianthus annuus*, Sept. 22nd (Ckll.); at flowers of *Verbesina encelioides*, College Farm, Sept. 11th (Ckll.); also three others, taken at Las Cruces by Prof. Townsend, Aug. 5th. This resembles *M. aurigenia*, but is a little larger, the clypeus more covered, nervures darker, and the apex of the abdomen is broadly submarginate, sometimes entire.

What I have considered to be typical *menuacha* (always with the yellow spot on mandibles) does not occur in the Mesilla Valley, but is common at Santa Fé (in August, at flowers of *Argemone* and *Grindelia*); and was also taken by me at La Junta, Colo., at flowers of *Lepachys*, and in Fremont Co., Colo. It is almost exactly like *aurigenia*, but uniformly a size larger.

ANDRENIDÆ.

Andrena aliciarum, n. sp.

♀. Length about 10 mm. Black; head, thorax, and legs with short rather dense grey pubescence, feebly tinged with ochreous dorsally. Head ordinary; face about as broad as long, not densely pubescent; clypeus pale lemon-yellow, with the sides black, almost exactly semicircular large cream-coloured lateral marks, filling the area between the clypeus and the eye. Mandibles dark. Basal process of labrum prominent, deeply emarginate, so as to appear as a pair of rounded tubercles. Flagellum brown beneath from the fourth joint to the end, the first joint longer than the two following combined. Sides of vertex with large sparse punctures, irregularly placed. Mesothorax coarsely and very closely punctured; enclosure of metathorax rugulose, bounded by an impressed line. Tegulæ rather dark testaceous, but transparent. Wings yellowish-hyaline, apical margin broadly dusky, nervures fuscous, stigma dull fulvous; second submarginal cell small, higher than long. Pubescence on inner side of basal joint of tarsi blackish fuscous. Abdomen dullish, very closely punctured, the hind margins of the segments broadly testaceous. Apical hair-bands on segments 3 to 5, very dense on 5; second segment with the band represented by lateral patches. The under surface of thorax and abdomen, hind tibiæ, and sides of metathorax, carry a great quantity of bright yellow pollen.

Hab.—Orgara Pass, N. M., on the east side, Sept. 29th, 1896. This resembles *A. aliciæ*, Rob., in having a yellow clypeus in the female, though the yellow is more reduced than in *aliciæ;* the punctures of the abdomen in *aliciæ* are at most very feeble and sparse, quite different from *aliciarum*. It also resembles *A. pulchella*, Rob., but that is larger, and different in several ways. There is, further, some degree of affinity with *A. aureocincta*, Ckll., especially with regard to the abdomen.

Mesilla, N. M., U. S. A., Nov. 26th, 1896.

NOTES AND OBSERVATIONS.

THE PROBABLE CAUSE OF THE DECADENCE OF BRITISH BUTTERFLIES.—In the interesting discussion on this subject (*ante*, pp. 55, 102, 104), *Lycæna arion* is referred to as one of the species now on the point of extinction. I have spent several years among the Cotswolds, and my experience leads me to think that *L. arion* is often considered scarcer than it really is. Not that I know of any spot where it is abundant, but it turns up singly or in small batches in various localities. I have spent hours wandering over the spot where it was so abundant twenty-seven years ago; but though *L. icarus*, *L. adonis*, *L. argiolus*, and *L. minima* are all found there, I have not seen *arion* within three miles of its former haunt, nor have I heard of its capture in that locality. Only last year I learnt that several—I think twenty-seven was the number—had been taken, while several others were seen, on a steep hillside, along which I have passed about twenty times in a season without seeing any, so capricious is it in its choice of localities. I know of eight localities where it has been taken in the last five years, but would not set out with any confidence of finding it in any of them in the coming season. Only a small proportion of the captures each year get reported in the magazines, the majority being kept "dark," as the captors are not subscribers to the 'Entomologist,' &c.

Mr. Harcourt-Bath considers the isolation from the Continent as the primary cause in the extinction of species. Isolation is a necessary factor in the production of variations from the type, and Mr. Harcourt-Bath believes in local variation. If there is this variation in the different localities, then there must be isolation and inbreeding, for the introduction of new blood would preserve the type and lessen the amount of variability. If inbreeding is as injurious as Mr. Harcourt-Bath assumes, then those isolated continental local varieties must be dying out too, for many of the mountain forms are more widely separated from their fellows of the same species than are our English forms from those of the Continent.

I cannot agree with Mr. G. H. Conquest "that agriculture is practically the sole cause of the now comparative rarity of *L. arion*," for there are many slopes to all appearances exactly suited to its requirements—abundance of *Thymus serpyllum*, and not over-grazed—where I have searched in vain for both the larvæ and the imago. Burning the herbage may destroy some larvæ, but it cannot exterminate a species like *arion*.

The abundance or scarcity of a species is due to climatal causes, most insects being extremely sensitive, especially in the early larval stages, to changes of heat and cold, drought and moisture, the larvæ perishing very often from no apparent cause. The conditions most favourable to each species are necessary to enable a small percentage to reach maturity, and then these conditions cannot suit each species alike. Similar instances occur in botany, plants being most extraordinarily abundant some years and scarce in the intervening periods, for which we are unable to find a satisfactory solution. Perhaps the instance that most readily occurs to me is the extraordinary abundance of *Ophrys apifera* in 1885 on the Cotswolds, while it has been scarce ever since in those spots where one could not walk without treading on

it then, and now considerable search is necessary to discover two or three plants.—HAROLD J. BURKILL; 21, Avenue Victoria, Scarborough.

THE TEPHROSIA DISCUSSION.—It is perhaps fortunate that we have few species of Lepidoptera to perplex us to the same extent that the two insects known as *biundularia* and *crepuscularia* have done. Happily, however, there appears reasonable prospect of our being put in possession of facts of a more satisfactory character than the bulk of those of which we have present knowledge. The microscope is to be brought to bear on structural details of the imago, and we are to have comparative descriptions of the ova, larvæ, &c. Several careful workers are engaged in investigating these important matters; and it is probable that the results of their research will definitely settle the "one or two species" question.—R. S.

ON THE IRISH TEPHROSIA BIUNDULARIA.—I have read with the greatest interest Mr. Kane's valuable note on the occurrence in Ireland of the species which he records under the above name (*ante*, p. 105), and should like to offer one or two remarks thereon. In order to avoid possible confusion in the future, it seems necessary to point out that the single-brooded Irish *Tephrosia* with which he deals is *not* the *T. biundularia* of Borkhausen = *abietaria*, Hw. = *laricaria*, Dbld., Sta. Man. (*vide* South's List, p. 12; Briggs, in E. M. M. xxxii. p. 36; and Ent. Rec. viii. p. 76), but is the true *T. crepuscularia* of Hübner, which Doubleday, in his second Catalogue, incorrectly calls *biundularia*, an error in which he is followed by most present-day English writers; hence Mr. Kane's mistake. If our entomologists do not care to follow me in resuscitating Goetze's obsolete name of *bistortata* (1781) for our double-brooded species, Stainton's 'Manual' (ii. p. 28, 29) may quite safely be used as authority:—*T. crepuscularia*, Hb., Sta. Manual = Mr. Kane's Irish species; *T. laricaria*, Dbld., Sta. Manual = *bistortata*, Goetze, which is not yet recorded for Ireland. With regard to the "important matter" of the colour and pattern variation "in conjunction with a different period of emergence," which I understand Mr. Kane to say would settle for him the question of the existence of two species if placed "beyond controversy by long series with full data," plenty of our English collections furnish such; and if no one has adduced particular instances in recent contributions to the controversy, it is probably to avoid repetition of what has already been repeatedly published to that effect (see, for example, Entom. xix. 98, 158, &c.). I suppose the matter will not be allowed to rest until *every* provincial entomologist has seen with his own eyes series of the two insects, arranged with full data, in the way Mr. Kane suggests. It is evidently useless for writers to say that *they* have series so arranged.—LOUIS B. PROUT; 246, Richmond Road, N.E., April 12th, 1897.

TEPHROSIA BIUNDULARIA (OR T. CREPUSCULARIA?).—Now that the time has come round again for the appearance of *Tephrosia biundularia*, the following extracts from my note-books may interest the readers of the 'Entomologist.' Into the controversy as to whether or not *T. crepuscularia* and *T. biundularia* are one and the same species I am not capable of entering, as I have never seen the larva of what is known as *T. crepuscularia*. But I hope to get eggs during the season, and to

make a comparison of the larvæ. I have italicised what appear to me to be important features:—

First observed on May 2nd and 5th, 1888. Bred specimens emerged in my breeding-pots from larvæ beaten off birch in Delamere Forest the preceding summer. June 2nd, 1888, took a specimen at rest off an oak trunk in Delamere Forest. April 20th, 1889, took several specimens off oaks. May 24th, 1890, took one; 26th, took a number off oaks as usual, plentiful. June 13th, 1891, took six; from these I obtained eggs—oval, brilliant verdigris-green, no ribs or pattern; deposited in chinks of chip-box, surrounded with white down; hatched June 30th; fed larvæ on sallow. The following is a description of the larvæ:—

July 7th. Dark brown, with black head. Segments two, three, four, and last two or three, plain; the other segments have irregularly blotched white divisions. On the sides of the latter, on each segment, is an irregular trefoil-shaped blotch of the same white. Some of the larvæ are almost black, others are brown, but all have the white markings referred to. They prefer willow or sallow to oak. Proper food-plant birch.

July 12th. Head light brown. Caterpillar much the same as on the 7th, except that it is a lighter brown, and the white ornamentations are more irregular in shape.

August 9th. Colouring very variable; general aspect reddish or hazel-brown. Head small and reddish brown, *slightly notched on the top*. All the segments reddish brown on dorsal area, the three middle segments being always of a darker brown; *third segment has a large well-defined excrescence or enlargement on each side; the twelfth segment is slightly humped on its dorsal surface; this hump is in the form of two notches.* The legs, claspers, and under surface are always of a darker brown (sometimes almost black) than the dorsal surface. From the anal segment of this under surface there is always an indication of a yellowish stripe more or less continued towards the head. There is always a medio-dorsal dark brown stripe, very distinct, from head to anal segment; a subdorsal, well-defined (in most cases), but interrupted, very dark brown stripe, branching to the notches on twelfth segment and then to the anal claspers. Below this is a lateral, *wider*, pale yellowish or whitish stripe marbled with warm russet-brown shades, especially towards the extremities; this stripe contains the dark brown rings or spiracles with yellowish centres; it follows or branches right down the first of the anal claspers, and always appears upon them as a prominent wide double-line ornament of warm russet and pale yellow; it then reappears on the anal segment, and usually terminates in the anal clasper. Below this spiracular stripe the dark hazel under surface begins, after another stripe like the one branching to the notches. Variations are seen in all these shades, stripes, and colours; they are either *very light* (giving the caterpillar the appearance, when extended from or on its anal claspers, of a small light-coloured hazel or birch twig); or *very dark*, when the caterpillar appears to be beautifully marbled with black, various shades of russet-brown, and yellow. In a few cases the prevailing shade of the larva is light grey, the mid-segments being a darker grey, the broad lateral stripe

whitish, and the notched twelfth segment smoke-coloured. The caterpillars were now (August 9th, 1891) beginning to pupate in the soil.

On March 22nd, 1892, the first *T. biundularia* emerged; 26th, searched in Delamere Forest for the species, but without result. April 4th, 5th, and 8th, one imago emerged each day; 10th, two emerged; 11th, three emerged, obtained eggs from those which had previously emerged; 12th, one; 18th, one; 21st, six; 23rd, two. May 1st, several; 22nd, eggs from this brood hatched. June 6th, took two specimens at rest in Delamere Forest. 1893, 1894, and 1895, failed to find the species in either of these years. 1896, took one specimen at rest in Delamere Forest, March 28th; another on April 4th; and two on April 18th; Mr. Crabtree, four. Mr. Hargreaves took several during March, some almost black. One of Mr. Crabtree's was very beautifully but yet darkly marked; it resembled the typical *T. crepuscularia*, the only one of the kind, to my knowledge, seen in the Forest. April 25th, took five females and two males off tree trunks. They seem to rest on any sort of tree, palings, &c. June 24th, a larva, bred from eggs laid by the last brood (I lost all the rest through not being able to attend to them one day), went down to pupate. I failed this year (1896) to find any summer brood.—J. Arkle; Chester.

Immigrant Cockroaches. — Though *Periplaneta americana* and *Phyllodromia germanica* are now well established in these islands, it may be interesting to note two instances in which they appear to have been taken in the act of immigrating. On March 1st last, Mr. Bell-Marley sent me two of the former, which, after considerable trouble, he secured on February 20th in Covent Garden, where he does not think they are established; while on April 5th I received from Mr. Nicholson, of Kew Gardens, an immature specimen of the latter (*P. germanica*), which had arrived on the 3rd, from Ootacamund in the Madras Presidency, on living plants.—W. J. Lucas.

High-Flat Setting. — On reading the discussion on high-flat setting, I am reminded that its advocacy is no new thing. It was strongly recommended by two or three ardent reformers in the days of the 'Entomologist's Weekly Intelligencer,' but it then found little favour, and comparatively few converts have been made since; nor do I think that there is the faintest probability of many being forthcoming in the near future. British entomologists certainly do not desire to deter others from collecting insects which are not British, nor is there any wish on their part to force their ideas as to the best methods of setting upon those who prefer other methods; for inconsiderable and unimportant as these islands seem to be in the estimation of some of your correspondents, there is still room in them for more than one idea on more than one subject.

No doubt a common system of setting would have its convenience, as would also a common monetary or fiscal system, or a common language; but we "hardened Britishers" do not feel disposed to "fall into line" with the rest of the "civilised world," upon a point where we consider ourselves far in advance of other people, and where progress in their direction would mean a movement towards the rear.

For, to those who prefer the English style, a well-set specimen is a thing of beauty and a joy for ever; whereas a continental specimen, impaled on a long clumsy skewer, is a painful and distressing object. But of course there are differently constituted minds and varying standards of beauty, and where the uninstructed insular eye sees only ugliness and contortion, the enlightened cosmopolitan may be more happily circumstanced, for possibly

> "Some hidden hand
> Unveils to him the loveliness
> Which others cannot understand."

But I should like to ask for somewhat fuller information, on behalf of those among us who do not confine themselves simply to the Lepidoptera; for on the Continent it is the custom not to set Hymenoptera or Diptera at all, but simply to impale them at the top of long stakes. Are we to adopt the more advanced methods of the civilized world in this respect also, or shall we still be permitted to follow our own savage instincts and endeavour to set our specimens properly?

But consider further, what Mr. Sabine has already so cogently urged—the immense amount of inconvenience and heavy loss the proposed "reformation" would involve to the vast majority, in order to save a small minority a quite inconsiderable amount of trouble. For most British set insects can be easily relaxed and reset in the continental manner, if desired, and collectors of continental specimens would require very few of them; whereas, if the continental method of setting became general here, our cabinets would be rendered useless, and our entire collections would have to be reset, or replaced by fresh specimens; and this would entail so much labour, expense, and loss of time, that most of us would require a new lease of life before we were justified in incurring it. The parrot cry of "insular prejudice," which is so commonly urged against collectors of exclusively British insects, is almost unworthy of notice; for it is obvious that everybody must decide for himself how far he will go, and draw the line somewhere. We "islanders" have no objection whatever to others collecting the insects of the entire universe if they can; but it is expedient for most of us to confine ourselves to a particular part of the earth's surface, and that portion which constitutes our own country appears most convenient to the vast majority.

That collectors who are in a hurry to get together a heterogeneous collection, by indiscriminate exchanging with all sorts and conditions of men, should sometimes be dissatisfied with the result, seems to be quite in accordance with the known laws of Nature. They should confine their exchanging to those whose methods of setting suit them, and not endeavour, vainly, to suppress other people's individuality in order to absorb it into their own.—W. H. Harwood; Colchester.

Tinea cochylidella, *Stn.*—Mr. Bankes (E. M. M. 2, viii. p. 79) states that he has examined the "unique specimen described by Stainton in Ins. Brit. Lep. Tin. p. 32 (1854) as *Tinea cochylidella*, n. sp.," and is of opinion that it is only "a strongly aberrant specimen of *T. ruricolella*, Stn." He further considers that the last named is quite distinct from *cloacella*, Haw.—R. S.

Butterflies do not always Settle on Flowers of their own colour.—On one of the lovely days last week I was sitting in my garden here, watching the gambols of a trio of small tortoiseshell butterflies, which were enjoying, like myself, the glorious sunshine; rock cress (*Arabis alpina*) and wallflowers were out in profusion, but little else save a few primroses and forget-me-nots. The colours of some of the wallflowers were so balanced as to match, in proportion, the reds, yellows, and blacks of the gay little flutterers; and one would have supposed that their nectar was just as sweet as, and could have been imbibed with greater safety than, that of the *Arabis*: and yet, so far as my observation went, they invariably settled upon the white flower; that is, when they were not frolicking in the air or settled on the ground or grass. Bees, too, though they were not so exclusive in their choice, seemed to prefer the white blossom, upon which they were far more conspicuous than they would have been upon the darker blossoms.—Hy. Knaggs; Folkestone, April 6th, 1897.

Aberrations of British Lepidoptera.—We are pleased to observe that the figures of varieties of Lepidoptera published in the 'Entomologist' are so interesting to our French contemporary 'Le Naturaliste' that they, together with the remarks thereon, have been reproduced in that journal.

Committee for the Protection of Insects in Danger of Extermination.—At the meeting of the Entomological Society of London, held on the 7th inst., the following Memorandum of Association was adopted, and signed by the President, the Council, and many members:—

"We, the undersigned, being desirous of protecting from extermination those rare and local species of insects which are not injurious to agriculture nor to manufactures, do hereby agree by our own example, and by the exercise of our influence over others, to discourage the excessive collecting and destruction of those species of insects which, from their peculiar habits or limited range, are in danger of extermination in the United Kingdom. We further agree to accept, for the purposes of this Association, such list of species in need of protection as shall be drawn up, and from time to time, if necessary, amended, by the Committee of the Entomological Society of London appointed to this end."

A copy of this Memorandum of Association has been forwarded for signature to each of those societies which have expressed themselves as in sympathy with the objects of the Committee. — Chas. G. Barrett, *Hon. Sec.*; 39, Linden Grove, Nunhead, S.E.

CAPTURES AND FIELD REPORTS.

Early Appearance of Lycæna argiolus.—On March 19th the son of Mr. Jeffries, of this town, took a freshly emerged female *M. argiolus*; is not this an unusually early date for this species to be on the wing?—Spotswood Graves; Tenby, March 25th, 1897.

This evening I was surprised to find a perfect male specimen of *Lycæna argiolus* settled on a wall in our garden.—J. F. Bird; Rosedale, 162, *Dalling Road*, Hammersmith, W., April 13th, 1897.

AGROTIS CINEREA AT READING.—In his notes from Reading (*ante*, p. 117) Mr. Nash stated that the capture of *Agrotis cinerea* at Reading is unprecedented. I beg to say that I captured a specimen here on May 3rd, 1893, and recorded it (Entom. xxvii. p. 71); I also have three specimens captured here last year.—W. E. BUTLER; Hayling House, Reading, April 23rd, 1897.

[Mr. Nash has written to say that "all the trap captures, &c., should have been under the heading 'Notes from Gloucestershire.'"—ED.]

NOTES FROM READING.—*Phygalia pedaria*, taken at light, Jan. 5th. *Hybernia leucophæaria* and *Anisopteryx æscularia* were observed on Feb. 7th, on an old fence. On Feb. 14th *Bombyx rubi* emerged in breeding-cages placed by the kitchen fire. *Hybernia marginaria* occurred at light on Feb. 22nd, and *Nyssia hispidaria* was found on tree-trunks on the 24th of the same month. On March 8th I noticed *Gonopteryx rhamni* flying in my garden. *Endromis versicolor*, the first imago, from ova deposited by a female taken April 6th, 1896 (Entom. xxix. 166), emerged March 10th. Fine male *Tephrosia crepuscularia* were taken on March 20th and 29th, and worn females of the same species on the last mentioned date and on April 4th.—W. E. BUTLER; Hayling House, Reading, April 4th, 1897.

ILLUMINATED MOTH-TRAPS, 1896.—I enclose a list of insects taken in my traps last year and not previously recorded. It was a very good season for light here, and the bulk of the insects contained in my old lists occurred again, the best being *Smerinthus populi* (several), *Nudaria mundana* (extremely common), *Notodonta trepida* (common), *N. trimacula* (common), *Xanthia aurago* (a few; this species was common here last year on sugar), *Asteroscopus sphinx* (over 250 males; no females), *Aventia flexula*, *Eurymene dolobraria*, *Selenia lunaria*, *Boarmia repandata* var. *conversaria*, *Geometra papilionaria* (males only), *Acidalia imitaria* (the last six species all quite common), *Eupithecia coronata* (two), *Lobophora viretata* (first brood common, second fairly so), *Tinea semifulvella* (both broods common). It is, I think, very curious to notice how some insects refuse to come to light. I observed this especially in *D. cultraria*, which was very plentiful in May all round the traps, but not one was taken; while *D. falcataria* and *D. binaria*, both of which were very scarce, were both taken; in fact, *falcataria* was obtained in no other way. The same applies to *Anchocelis rufina*, which was exceedingly common on sugar close to the traps, and was never taken; whereas *A. pistacina*, which was very little, if at all, commoner, was taken frequently. On looking over my old lists, I find I included in one of them *Agrotis corticea*. This was an error, as I subsequently found that the insect was only an extreme form of *A. segetum*. I do not think *A. corticea* occurs here, at any rate I have not come across it.

The following are new to the "light list," viz.:—*Lithosia sororcula* (three), *Arctia caia*, *Spilosoma fuliginosa* (one male), *Trichiura cratægi* (one male), *Bombyx neustria*, *Drepana falcataria* (a few males), *D. binaria* (a few males), *Thyatira batis* (a few males), *Cymatophora duplaris* (one male), *Acronycta alni* (one male), *A. rumicis*, *Leucania comma*, *Hydræcia micacea*, *Mamestra sordida*, *Apamea basilinea*, *Caradrina morpheus* (one male), *Agrotis puta*, *Noctua augur*, *N. baia* (two), *N. castanea* var. *neglecta*, *Calymnia diffinis* (one), *Habrostola triplasia* (one), *Plusia iota*, *Zonosoma pendularia*, *Acidalia dilutaria*, *A. marginepunctata*, *Halia vauaria*, *Emmelesia alchemillata*, *Eupithecia venosata* (a few), *E. fraxinata* (two), *E. albipunctata*, *E. subciliata* (the only one I have known here), Hypsipetes

trifasciata (two), *Melanippe procellata* (one), *M. rivata*, *M. galiata*, *Anticlea rubidata*, *Cidaria prunata* (one), *Chesias rufata* (one), *Scoparia dubitalis*, *S. mercurella*, *S. truncicolella*, *S. augustea* (one in Oct., 1895), *Pterophorus monodactylus*, *Crambus perlellus*, *C. hortuellus*, *Ephestia kühniella* (one, Nov. 10th, 1895), *Rhodophæa consociella* (one), *R. advenella* (one), *Oncocera ahenella* (one), *Tortrix corylana*, *Leptogramma scabrana* (one), *Peronea mixtana* (one), *P. schalleriana*, *P. cristana*, *P. ferrugana*, *Teras contaminana*, *Dictyopteryx bergmanniana*, *Penthina corticana*, *P. betulætana*, *Orthotænia striana*, *Phlœodes immundana* (one), *Pædisca occultana*, *Carpocapsa splendidana* (one), *Catoptria scopoliana* (or possibly *cana*), *Eupœcilia maculosana*, *Xanthosetia zoegana* (one), *Argyrolepia badiana*, *Lemnatophila phryganella*, *Talæporia pseudo-bombycella*, *Tinea lapella*, *Swammerdammia combinella* (one), *Hyponomeuta cagnagellus*, *Anesychia decemguttella* (one), *Cerostoma radiatella*, *Harpipteryx xylostella* (one), *Teleia humeralis* (one), *Butalis grandipennis* (one), *Gracilaria alchimiella* (several). —E. F. Studd; Oxton, Exeter, March 17th, 1897.

SOCIETIES.

Entomological Society of London.—*March 3rd*, 1897.—Mr. R. Trimen, F.R.S., President, in the chair. Mr. George W. Bird, of the Manor House, West Wickham, Kent; Mr. Alfred H. Martineau, of Solihull, Warwickshire; Mr. Hubert C. Phillips, M.R.C.S., of 83, Shirland Gardens, W.; Mr. William A. Vice, M.B., of 5, Belvoir Street, Leicester; and Mr. Colbran J. Wainwright, of 147, Hall Road, Handsworth, Birmingham, were elected Fellows of the Society. The Secretary announced that the Committee appointed to consider the question of the protection of British insects in danger of extermination had unanimously resolved that it was desirable to form an Association, the members of which should agree to discourage, by their own example and by their influence, the excessive collecting of all those species of Lepidoptera which from their habits appeared to be in danger of extermination; that this resolution had received the approval of the Council, who would refer the matter back to the Committee, in order that definite proposals for the formation of such an Association might be drafted, and it was hoped to lay these proposals before the Society for discussion upon April 7th. Mr. Champion exhibited, on behalf of Messrs. Godman and Salvin, a portion of the Elateridæ, and the Cebrionidæ and Rhipidoceridæ, recently worked out by him in the 'Biologia Centrali-Americana.' The Elateridæ included 531, the Cebrionidæ 29, and the Rhipidoceridæ 14 species, a large proportion of which were described as new. He stated that his labours had been much facilitated by the free access to the very extensive collection of Elateridæ formed by the late E. W. Janson, and by the loan of many types from Dr. Candèze, who had lent valuable aid. He called attention to the excessive rarity of the males in the Elaterid genera *Chalcolepidius* and *Semiotus* (the contrary being the case in the genus *Scaptolenus* of the Cebrionidæ, and also in many Elateridæ), and to the fact that the sexual characters of *Semiotus* had been misunderstood, the supposed males being really females. In the "fire-flies"

(*Pyrophorus*), a genus containing a large number of extremely closely-allied forms, important specific characters were detected in the genitalia of the males. One species, *Meristhus scobinula*, Cand., was common to Central America and China. He also exhibited a specimen of *Eudectus giraudi*, Redt., found by himself at Mendel, in the Austrian Tyrol, in July last. This is a rare European species of Staphylinidæ, a black variety of which (*E. whitei*, Sharp) had once been found in Scotland, on the summit of Ben-a-Bhuird. Mr. Jacoby showed a Halticid beetle, taken in Mashonaland by Mr. G. A. K. Marshall, and remarkable for a prolongation of the hind tibia beyond the tarsal articulation, into a very long serrated process. Mr. Elwes showed a series of Papilionidæ of the *machaon* group, from North America, including *P. machaon* and *P. oregonia* from British Columbia, *P. brucei*, *P. bairdii*, and *P. zolicaon* from Glenwood Springs, Colorado, and the latter species from British Columbia. He stated that there was a tolerably complete gradation from *P. oregonia* (= *machaon*) through *P. brucei* to *P. zolicaon*, that none of the characters which had been relied on for separation were of real value, and that the structure of the genitalia afforded no assistance. Although *P. bairdii* appeared to be very distinct in appearance and habits, it was associated with the other forms in Colorado, and Mr. W. H. Edwards stated that he had bred both *P. bairdii* and *P. oregonia* from eggs of the same female of either of the two forms. Mr. J. J. Walker mentioned that he had bred *P. zolicaon* from larvæ found on *Sium*, at Esquimault, Vancouver Island, and that neither larva nor pupa was distinguishable from that of *P. machaon*. Mr. O. H. Latter read a paper on "The Prothoracic Gland of *Dicranura vinula*, and other notes," in continuation of his previous communications on the subject. A fresh use of the formic acid secreted by the larva was described; it was employed to alter the silk secreted in spinning the cocoon, in order to convert it into the well-known horny mass. If the acid was prevented from acting, as by supplying the larvæ with bits of blotting-paper soaked in an alkali, to be utilised in making the cocoon, the silk thus protected from the action of the acid retained its usual fibrous structure. Sir George Hampson communicated a paper on "The Classification of two sub-families of Moths of the Family Pyralidæ—the Hydrocampinæ and Scoparianæ."

March 17th.—Mr. Roland Trimen, F.R.S., President, in the chair. Mr. Henry Hague, care of the Clydesdale Bank, 30, Lombard Street, E.C., was elected a Fellow of the Society. Mr. Butterfield, present as a visitor, exhibited a series of thirty-three male and six female *Phigalia pedaria*, taken near Bradford, Yorkshire, on Feb. 14th–17th, 1897. Twenty-one males were typical in having a greater or less development of the four transverse bars. The remaining twelve were without bands, and varied in colour from black to smoky olive; they were decidedly less in point of size, ranging from $1\frac{5}{12}$ in. to $1\frac{7}{12}$ in., as against $1\frac{7}{12}$ in. to $1\frac{11}{12}$ in. in the banded forms, and were also poorer in scales and slightly deformed. He had only met with this variety once before in the last twenty years, and suggested that the eruption of small, black, and depauperized forms might have been produced by dryness and want of food in the larval conditions, the trees having been extensively defoliated in the preceding year. Mr. Tutt, in the

course of the subsequent discussion, agreed with this view. Mr. Porritt said that the melanic variety had occurred to his knowledge for several years in the Bradford district, and that similar varieties, *e.g.* in *A. betularia*, showed no signs of depauperization. Mr. Kirkaldy exhibited an example of the rare macropterous form of *Velia currens*, Fabr., taken at East Grinstead, and one of *Cicadetta montana*, Scop., from Brockenhurst. Mr. Burr exhibited a series of grasshoppers with red and blue hind wings of the family Œdipodidæ, to show the remarkable variation in colour seen in this group. Red, blue, and yellow forms are found alike in the same species, the blue being due to the failure of the red pigment, and therefore an incipient albinism, the yellow being a further form of albinism. Mr. Champion communicated a paper on the Elateridæ and Rhipidoceridæ collected by Mr. H. H. Smith at St. Vincent, Grenada, and the Grenadines, and exhibited the specimens. Dr. Forel also communicated a paper on the Formicidæ collected by Mr. Smith in the same islands.—W. F. H. Blandford, *Hon. Sec.*

April 7th.—Mr. Roland Trimen, F.R.S., President, in the chair. The following Memorandum of an Association for the Protection of Insects in danger of extermination, which had been drawn up by a Committee appointed for the purpose and approved by the Council, was laid before the Society and signed generally by those present:—"We, the undersigned, being desirous of protecting from extermination those rare and local species of Insects which are not injurious to Agriculture nor to Manufactures, do hereby agree, by our own example and by the exercise of our influence over others, to discourage the excessive collection and destruction of those species of Insects which from their peculiar habits are in danger of extermination in the United Kingdom. We further agree to accept for the purposes of this Association such list of species in need of protection as shall be drawn up and, if necessary, from time to time amended by the Committee of the Entomological Society of London appointed to that end." The draft of alterations and additions to the Society's Bye-laws, recommended for adoption by the Council, was read for the first time. Mr. McLachlan showed, on behalf of Mr. Gerald Strickland, a magnified photograph of *Brachycerus apterus*, obtained by direct enlargement in the camera, and extremely clear in definition and detail. Mr. Tutt exhibited some of the silk used by *Tephrosia bistorta* to cover its ova, and discovered by Dr. Riding. It was contained in a pouch at the extremity of the abdomen in the form of dense bundles about 2 mm. long, and resembling in miniature locks of wavy flaxen hair. Hitherto all such coverings were supposed to consist of scales from the anal segment. Papers were communicated by Prof. Miall, F.R.S., on "The Structure and Life-history of *Limnobia replicata*," and by Messrs. Godman, F.R.S., and Salvin, F.R.S., on "New Species of Central and South American Rhopalocera."

South London Entomological and Natural History Society.—*February 25th*, 1897.—R. Adkin, Esq., F.E.S., President, in the chair. Mr. Bishop, of Kingston-on-Thames, was elected a member. Mr. Billups exhibited, for Mr. Sauzé, some seventy species of Diptera, *Coleoptera*, Neuroptera, &c., which had been taken during the last

year. Mr. Tutt, specimens of *Aglais* (*Vanessa*) *urticæ*, var. *ichnusa*, from Corsica, and remarked that Mr. Merrifield's experiments had resulted only in an approximation to this var. He also showed specimens of *Thais cerisyi*, var. *deyrolii*, from S.E. Europe. Mr. Adkin, two series of *Pachnobia hyperborea* (*alpina*), one from Rannoch and the other from Shetland, and made remarks on its local variation and its unaccountable intermittent appearance. In the discussion which followed, Mr. McArthur gave his experience of its appearance in alternate years. Mr. Tutt suggested that the species still retained its boreal habit of remaining two years in a larval condition. Mr. Adkin instanced *Retinia resinella* as having a precisely similar habit. Mr. Mansbridge, a smoky var. of *Spilosoma lubricipeda* from York. Mr. Tunaley, a large number of species from Aviemore, including long and very varied series of *Erebia æthiops*, *Eupithecia sobrinata*, *Larentia didymata*, *Thera simulata*, *T. firmata*, *Cidaria immanata*, *Emmelesia minorata*, *Pædisca ophthalmicana*, *Gelechia populella*, and others, especially selected to show the range of variation occurring in that locality. Mr. Tunaley read a paper entitled "Notes and Observations in a Holiday in the Black Forest of Scotland from July 29th to Sept. 10th, 1896." In a few words he described the geographical surroundings and the geological formation of the district, together with an account of the weather he experienced and some remarks on the necessary equipment for collecting among the Scotch mountains. He then took the more prominent species, and described the variations, peculiar habits of life, and their protective resemblances. Several of the species were noted as having different times of appearance at different elevations, e. g. *E. æthiops*. He said that *Cloantha solidaginis* at rest on a fir-post closely resembled a piece of curled bark, and pointed out the extensive variation in the central band of *T. juniperata*. The paper was interspersed with apt remarks on Scotch characteristics and terse descriptions of the environment of each species. In the discussion which followed, Mr. Tutt compared the habits of *E. æthiops* in the Alps with those of the species in Scotland, and also contrasted the allied species *E. ligea*, which hid in the fir trees on the disappearance of the sun. Mr. Barrett said that *Epinephele ianira* also roosted in the branches of trees at sunset.

March 11th.—The President in the chair. Mr. Lucas exhibited living nymphs of the dragonfly, *Pyrrhosoma minium*, from Oxshott. Mr. Tutt, a pine-branch with a nest of a gregarious europterid moth, sent from Cannes by Dr. Chapman; it was presumably that of *Cnethocampa pityocampa*. He then gave the results of a recent examination of the ova of *Tephrosia crepuscularia* (*bistortata*) and *T. biundularia*, illustrating his remarks with black-board diagrams from drawings made under the microscope that day. There were three distinct batches of ova: (1) of *T. crepuscularia*, (2) of *T. biundularia*, and (3) of the result of a cross between the two species, a female of the former and a male of the latter. The shape and texture of the three batches were well-differentiated; those of *T. biundularia* were smaller, somewhat oval in shape, of a yellow colour, and more opaque; whilst those of *T. crepuscularia* were cylindrical with rounded ends, of a pearly-green slightly transparent and iridescent. The ova which were the result of the cross were intermediate in size, slightly more rounded at one end than

the other, and more variable *inter se* than either of the other batches, which were remarkably constant in their characters. He was indebted to Mr. Bacot for the opportunity of examining these batches side by side under the microscope; that gentleman had succeeded in breeding the species at the same time, and had forwarded him the ova on the same day as they were laid. He did not know whether each batch was the product of a single female, or not. Mr. Tutt then referred to the alleged occurrence of *T. biundularia* in Morayshire, and said that the opinion of several members was that Mr. Adkin's specimen was only *T. crepuscularia*. Mr. Horne's specimen from the same district was now exhibited, and he (Mr. Tutt) said that it was identical with the Perthshire specimen, and of the same type as the Central European forms of *T. crepuscularia*. Mr. Montgomery, larvæ of *Mania maura* which he had obtained from Mr. Young, of Rotherham. Mr. Adkin, specimens of *Abraxas grossulariata*, in one of which the yellow band extended across two-thirds of the hind wing, and in the other the yellow colour was reduced in intensity to a very pale buff. He also showed an example of *Arctia caia* with the fore wings much suffused with brown, and with the blue-black blotches of the hind wings much run together. A long discussion took place on the protection of insects in danger of extermination, and finally the following resolution was adopted:—"That the thanks of the South London Entomological and Natural History Society be given to the Committee of the Entomological Society of London for the protection of species of insects in danger of extermination; that the Society strongly approves of the work; and that the members present pledge themselves to use their personal efforts to further the objects of the Committee."

March 25th.—The President in the chair. B. H. Waters, Esq., 48, Finsbury Pavement, E.C., was elected a member. Mr. McArthur exhibited specimens of *Melanippe hastata* from various localities, and said that he had never taken the species in Shetland, nor had he seen the food-plant there. Rev. E. Tarbat, a gynandromorphous specimen of *Melanargia galatea*, taken at Swanage; the markings of the under side followed those of the upper. Mr. Mansbridge exhibited a bred series of *Anchocelis rufina* from Huddersfield, which were less uniformly tinted than the southern examples of this species usually are. Mr. Tutt, specimens of *Phigalia pedaria* (*pilosaria*), taken near Bradford by Mr. Butterfield [*vide* Rep. Ent. Soc. Lond., March 17th, *ante*, p. 147]. Mr. Mansbridge said the black was of a different kind to that of the melanic specimens he had seen from the West Riding. Mr. Tutt reported that Mr. Clarke had taken *Tephrosia crepuscularia* this spring from the wood which Mrs. Bazett had asserted did not produce it, and so confirmed the statement made by Mr. Henderson last October. Rev. E. Tarbat also reported the species from woods near Reading. Mr. Turner, living larvæ of *Cleora lichenaria*, taken in Ashdown Forest, and remarked on their wonderful resemblance to the lichen upon which they fed. He also made a few remarks on the district in anticipation of the proposed visit of the Society at Whitsuntide. Mr. Adkin, series of *Abraxas grossulariata*, bred from Perthshire larvæ, including a noticeable var. with fore wings having a broad white central band with a large circular black discoidal spot, and hind wings also having a large discoidal spot. A paper entitled "Representative Species," by Prof.

A. Radcliffe Grote, A.M., was then read by Mr. Tutt. It dealt at some length with the identical and parallel species which existed in the two continents. The evidence pointed to a continuous land connection between the nearctic and palæarctic regions. Mr. Tutt said he had no doubt that the two faunas had been distributed from the circumpolar region while there existed a subtropical climate there. It was announced that the 'Proceedings' for 1896 were now ready for distribution to members.

April 8th.—The President in the chair. Mr. South exhibited the following Geometridæ from Europe and Eastern Asia:—*Eustroma reticulata* and var. *ærosa*, the latter larger and more golden yellow. *Cidaria silaceata*, Chinese specimens, both larger and smaller than European. *C. corylata*, Eastern examples, very typical. *C. picata*, some Chinese specimens, larger and more yellow than European. *Melanippe procellata*, some were larger than European, and some with ground colour suffused with fuliginous. Mr. Lucas, specimens of an exotic earwig, *Amisolabis annulipes*, which could be distinguished from other British species by two white joints near the tip of the antennæ. The distinctly ringed femora give it its specific name. It was found in 1894 at Tavistock, but the specimens exhibited came from Surrey [figured *ante*, p. 125]. Mr. Adkin, a fine series of red forms of *Tæniocampa gracilis* from the New Forest and Rannoch. Mr. Tutt read a paper entitled "Some Considerations of Natural Genera, and Incidental References to the Nature of Species."—Hy. J. Turner, *Hon. Report Sec.*

Cambridge Entomological and Natural History Society.—*February 12th*, 1897.—Dr. Sharp, President, in the chair. The President showed a remarkable stridulating apparatus in a larva of the coleopterous genus *Passalus*, recently sent by Mr. C. Hose from Borneo. This larva possesses two pairs of largely-developed legs, while each leg of the third pair remains a mere rudiment, but is much altered in form, so as to be like a small paw, with four or five chitinous digits at the extremity wherewith to play on a striated area on the coxa of the leg before it. He remarked that Passalid larvæ are very abundant in logs in the tropics, and that Mr. Champion had informed him that he had heard stridulation proceeding from such logs in Panama. The President also said it was difficult to imagine what use such an elaborate organ could be to larvæ, especially when they led a life of the kind mentioned. He also demonstrated the stridulation of Coleoptera by means of a large individual of the longicorn genus *Batocera*, which produced a rather loud sound when the appropriate movements were made. Mr. Fleet exhibited some Coleoptera, including the blister-beetle and *Apion astragali*, taken at Cambridge some years ago by Mr. Rippon.

February 26th.—Annual Meeting.—Dr. Sharp in the chair. Prof. Newton, the Professor of Zoology, was elected an honorary member. Mr. Harmer, of King's College, was elected President for the following year. Dr. Sharp exhibited a larva of one of our common *Geotrupes*, and called attention to its stridulating organ, in which one pair of legs work upon the pair in front of them. He said that this beetle, in the imago state, also possesses a stridulating organ, but it is situated in a

different position anatomically, and therefore not corresponding with the larval organ. The latter is lost in the imago, and it is clear that this elaborate structure exists solely for the larval state; but Dr. Sharp acknowledged that he was unable to guess what use such a structure could be to a larva, leading as this does an underground life, and having, as far as we know, no relations with the lives of other individuals of its own species that could be influenced by any sound it might make.

March 12th.—The President in the chair. Dr. Sharp exhibited, on behalf of Dr. Haviland, part of his magnificent collection of *Termites.* His method of preparation consists in placing the various forms of a species found in one nest in glass-tubes divided into compartments by cotton-wool and filled with spirit. A photograph of a termitarium of *Termes malayanus,* taken *in situ* after it had been sectionised, showed the royal cell in the middle of the structure, and the chambers for growing fungi—this species being a fungus grower—about the periphery. Portions of this nest and individuals taken from it were exhibited. The nest is composed of thin fragile laminæ of a pottery-like structure; but the royal cell, composed of this substance, is very thick and solid. The fungus-chambers are not constructed of clay, but of comminuted vegetable matter, subsequently cemented together. The specimens taken from this nest included two queens and one king from the royal cell, large and small soldiers, and large-headed and small-headed workers.—L. Doncaster, *Hon. Sec.*

Birmingham Entomological Society.—*February 15th,* 1897.—Mr. R. C. Bradley in the chair. Exhibits:—By Mr. Bradley, unusually fine large specimens of *Cimbex sylvarum* from Sutton. By Mr. A. H. Martineau, bramble stems containing pupæ of aculeate Hymenoptera, and explained how he collected them in this manner; also cocci of cochineal as imported; also Vespæ, to show their position during hybernation—they hang by their mandibles, with their legs all drawn up and their wings under the body, the wings to some extent supporting the body. By Mr. G. W. Wynn, varieties of *Cerastes vaccinii* and *C. spadicea,* taken at sugar at Hanbury Park; one of *C. vaccinii* had a pretty chestnut thorax, with chestnut marginal bar and fringes and some at the base of the fore wings, the rest of the fore wings being greyish, giving the appearance of a chestnut insect with greyish bars. By Mr. Fountain, local bred *Nyssia hispidaria.* By Mr. C. J. Wainwright, rare Diptera, including *Orthoneura brevicornis* (a pair from Sutton), *Chrysogaster virescens,* female (from Sutton), and *Chilosia berganetammi.*

March 15th.—Mr. G. T. Bethune-Baker, President, in the chair. Exhibits:—By Mr. R. C. Bradley, various Lepidoptera. By Mr. A. H. Martineau, *Odynerus livipes* from Wyre Forest, a rare insect, which he said seemed to be well established at Wyre, as Mr. Bradley had also taken specimens there on another occasion; he also showed *Sphecodes niger,* male. By Mr. Bethune-Baker, two drawers containing a portion of the Papilionidæ, with the genus *Parnassius* and its allied genera; they included *Luehdorfia puziloi* from Vladivostock, *Sericinus telamon* from Eastern Asia, *Ismene helios* from Switzerland, &c., and a fine rich dark variety of *Doritis apollinus* from Asia Minor, with a great deal of red and more black than usual.—C. J. Wainwright, Hon. Sec.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*March 8th.* The President, Mr. S. J. Capper, F.L.S., F.E.S., in the chair. Mr. Fred Birch read a paper entitled "An Excursion to *Cassiope*-land, with a sample of its Entomologial Fauna," in which he graphically described a visit to the grand Langdale Pikes, in Westmorland, in search of this the only alpine species of butterfly occurring in England, which he was successful in capturing, along with *Crambus furcatellus* and other rare mountain species. The Rev. A. M. Moss also read a paper entitled "Notes on *Cidaria reticulata* from Windermere," in which he recounted his experience in taking this species in the larvæ and imago stages. Both papers were well illustrated by numerous specimens. Mr. Moss also exhibited a drawer of Bombyces, with life-histories. Mr. J. G. Mason, a long series of *Tæniocampa opima*, bred a week previously. Mr. John Watson, *Colias hyale* and vars. *poliographus* and *simoda*, *C. erate* var. *sareptensis* and ab. *erioptera*, and *C. romanovi*.—T. N. PIERCE, *Hon. Sec.*

THE NONPAREIL ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*December 3rd*, 1896.—Mr. Harpur exhibited a block of solid African ebony in which was a large boring, out of which he had extracted the body of a caterpillar very much like *Cossus ligniperda* in shape and colour, and probably an African representative of that species. Mr. Walmer exhibited insects from the New Forest. Mr. Lusby exhibited a good series of *Ocneria dispar* with a series of *P. bucephala*. Concerning *L. dispar* a curious fact came to light. Last autumn Mr. Gurney gave some eggs of the species (all laid by the same female) to Messrs. Lusby, Craft, and Newbery. The larvæ resulting from these were fed up; Mr. Lusby's on red-flowered hawthorn, and those of Messrs. Craft and Newbery on white-flowered hawthorn. Mr. Lusby could get nothing else to feed his larvæ upon, and the leaves he said were large, old, and tough. The imagos resulting from these were fine large specimens, whilst those of Messrs. Craft and Newbery were small and stunted. Mr. Craft showed a box of bred insects from Nottingham. Mr. Newbery exhibited a series of *Hybernia aurantiaria* and *H. defoliaria*, both sexes, with a variable series of *Cheimatobia brumata*, taken at Wood Street on November 28th.

December 17th.—Messrs. Gurney and Martin exhibited series of *H. aurantiaria* and *H. defoliaria*, taken at Wood Street. It would seem that both species, and also *C. brumata*, were very plentiful, although the specimens were not quite as large as usual. Mr. J. A. Clarke exhibited twelve specimens of *Lycæna ægon*; these included two typical males from Cumberland and two ordinary females from Box Hill. The remainder were female specimens from Cumberland.

March 4th, 1897.—Mr. Huckett exhibited a case containing handsome series of *A. grossulariata*, among which were some very fine dark and suffused forms; also series of *A. prunaria*, *L. salacis*, and *P. syringaria*. Mr. Schooling exhibited series (bred from egg) of *A. remutata*, *M. galiata*, and *M. rivata*. He took *galiata* at Ramsgate, and in gathering bedstraw as food for the larvæ he obtained eggs of *rivata*, which he fed on knot-grass and then dandelion during hybernation. In July he also took *A. aversata*, from which he obtained eggs, reared the subsequent larvæ, and the imagines emerged about August, all females,

Mr. Smith exhibited a specimen of the Australian species *Agarista glycinæ*, taken in the Spaniards Lane (Hampstead) at dusk. The opinion was that either it had been accidentally imported into this country in the pupa state, or else had escaped from the cage of someone breeding the insect in that neighbourhood. He also showed male and female specimens of the great water-beetle (*Dytiscus marginalis*). Mr. Harpur, Jun., exhibited *P. pilosaria*, *H. leucophæaria*, and *A. æscularia*, taken last week in Highgate Woods.

March 18*th*.—Mr. Pearce showed *Sesia scoliæformis* and *P. alpina*, both bred from Scottish larvæ, which he stated were obtained in exchange for dark vars. of *H. abruptaria*. Mr. Pickett exhibited very fine foreign insects; preserved larvæ of *A. atropos* and *S. convolvuli*, taken at Folkestone; also larvæ of *M. cinxia*, *M. artemis*, *A. paphia*, *S. fagi*, and *E. jacobææ* (? locality). Mr. Stevens had on view a pretty series of *Dianthœcia*, including *carpophaga*, *capsincola*, and *cucubali*. Mr. Stillwell, three specimens of a beetle imported in a truss of alva from Sweden; these were very like our *Melalontha vulgaris*, of which there was a specimen in the box. Mr. J. A. Clarke exhibited a very fine bred series of *N. hispidaria*, bred from ova deposited by a female taken on an oak near Chingford Hotel. The specimens were remarkably light. Several members promised to read papers at future meetings.

April 1*st*.—The chief feature of this meeting was the series of *Brephos parthenias* taken recently at Epping by several members. Mr. Croft, Jun., exhibited a very light female specimen of *H. ianira*. A very fine and long series of *T. miniosa* (fifty specimens) was shown by Mr. Samson; they were bred this year from seventy larvæ taken near Winchester. Mr. Pickett exhibited a fine series of *E. versicolor*. He said they were bred from pupæ sent by a gentleman in Kent. The curator, in passing the exhibit, remarked that they were probably Tilgate specimens from their size. Mr. Pickett also exhibited preserved larvæ of *O. fascelina*, *A. alni*, *H. rupicapraria*, *C. hera*, *A. paphia*, *B. roboraria*, *S. fagi*, and *B. rubi*. Mr. Lusby exhibited a series of *B. parthenias*, taken at Epping in 1895. On being compared with those captured this year, an inferiority in size was distinctly noticeable. Mr. Stevens exhibited two English *A. cratægi*, with chrysalis case; and also male and female *A. prodromaria*, the male bred, and the female from Richmond Park. He also showed specimens of *A. betularia* from Wimbledon.—F. A. Newbery, *Reporting Secretary*.

RECENT LITERATURE.

Abstract of Proceedings of the South London Entomological and Natural History Society for the year 1896, together with the President's Address. Pp. 132. Published at the Society's Rooms, Hibernia Chambers, London Bridge. March, 1897.

Once again this successful and increasingly popular Society presents us with its annual volume, and we note with satisfaction that the date of publication is an earlier one than it has been for some

years past. It is to be hoped that this improvement will be maintained in future. In the President's Address reference is made to the question of "Collector *v.* Entomologist," and certain lines of experimental work suggested to the collector or practical entomologist who may desire to assist in elucidating some of the questions connected with variation, heredity, and the general laws operating in the production of species.

The 'Proceedings' will be found to embrace a good deal of instructive matter, and the papers generally are excellent. Among the latter we would especially direct attention to Mr. Enock's "Life-history of *Cicindela campestris*"; "Further Notes on *Triphæna comes*, Hb. (*orbona*, Fab.)," by Mr. R. Adkin; "Is Cold the Cause of Melanism in Scotch Specimens of *Triphæna orbona*, Hufn. (*comes*, Tr.)?" by Mr. Tutt; "What is the Cause of Melanism in the Scotch Specimens of *Triphæna comes*, Hb. (*orbona*, Fb.)?" by Mr. Adkin; and "Notes on *Acidalia marginepunctata* and *Cyaniris* (*Lycæna*) *argiolus*," also by Mr. Adkin.

The figures of portions of the male antennæ of *Hybernia aurantiaria* and *H. defoliaria*, reproduced from photographs by Mr. F. Clark, are of great interest; and the same remark applies to the drawings of *C. argiolus* depositing ova, and those showing larvæ of the same species resting on flower-buds of ivy.

Report of Observations of Injurious Insects and Common Farm Pests, during the year 1896, with Methods of Prevention and Remedy. Twentieth Report. By ELEANOR A. ORMEROD. Pp. i–x, 1–160. London: Simpkin, Marshall, Hamilton, Kent, & Co., Limited. 1897.

THE importance of Miss Ormerod's annual volume is now so widely acknowledged, and its value so generally understood, that it seems unnecessary to do more than announce publication of the Report for 1896. It may be noted, however, that although "many kinds of agricultural insect infestations were present during the year, no special attack was seriously prevalent over the whole island." Altogether some thirty injurious insects are referred to, and of these eleven belong to the order Lepidoptera, and six to Coleoptera. The article on *Carpocapsa pomonella* (the codlin moth), and that on the two parasitic flies—*Cephenomyia rufibarbis* and *Lipoptera cervi*, are each of considerable interest. In the chapter on *Musca domestica* a great deal of information concerning the life-history of the species is brought together.

Notes on Lepidoptera Collected in the Edinburgh District. By WILLIAM EVANS, F.R.S.E. (Ann. Scott. Nat. Hist., No. 22, pp. 89–110, April, 1897.)

Preliminary List of the Neuroptera and Trichoptera of Yorkshire (omitting Psocidæ and Ephemeridæ). By G. T. PORRITT, F.L.S., F.E.S. ('Naturalist,' April, 1897, pp. 115–126.)

Imaginal Discs in Insects. By HENRY S. PRATT, Ph.D. ('Psyche,' February, 1897, pp. 15–30.)

A New Hypothesis of Seasonal-Dimorphism in Lepidoptera. By A. G. MAYER. (*Op. cit.*, pp. 47–50.)

Ichneumonides d'Afrique. By Dr. J. TOSQUINET. ('Mémoires de la Société Entomologique de Belgique,' v., pp. 430. 1896.)

Le Cocciniglie Italiane viventi sugli agrumi. Parte III. I. Diaspiti. By Prof. ANTONIO BERLESE. Firenze. 1896. This part continues the work from p. 203 to p. 477. There are two hundred figures in the text, and twelve lithographic plates, two of which are coloured, and two others tinted.

A Check-List of the Coccidæ. By T. D. A. COCKERELL. 'Bulletin of the Illinois State Laboratory of Natural History,' vol. iv., article xi. Springfield, Illinois: H. W. Rokker. 1896.

The Principal Household Insects of the United States. By L. O. HOWARD and C. L. MARLATT. With a chapter on "Insects affecting dry Vegetable Foods." By F. H. CHITTENDEN. ('Bulletin' No. 4. New Series. U.S. Department of Agriculture. Division of Entomology.) Pp. 130, numerous figures in text. Washington: Government Printing Office. 1896.

Insects affecting Domestic Animals: an account of the species of importance in North America, with mention of related forms occurring on other animals. Prepared under the direction of the Entomologist, by HERBERT OSBORN. ('Bulletin' No. 5. New Series. U.S. Department of Agriculture. Division of Entomology.) Pp. 302, fully illustrated. Washington: Government Printing Office. 1896.

Insects affecting the Cotton Plant. By L. O. HOWARD, Ph.D. (U.S. Department of Agriculture. Division of Entomology.)

An Essay on the Development of the Mouth-parts of certain Insects. By JOHN B. SMITH, Sc.D. Pp. 24, plates 3. Reprinted, November, 1896, from Transactions of Amer. Philos. Soc., vol. xix.

New Mallophaga (pt. ii.), *from Land-Birds; together with an Account of the Mallophagous Mouth-parts.* By VERNON L. KELLOGG. Pp. 118, plates 14. Palo Alto, California: Leland Stanford, Jr. University. 1896.

OBITUARY.

WE regret to announce that Mr. CLARENCE FRY died suddenly on the golf links at Northwood, near Watford, on April 10th last. It may be said that indirectly we were largely indebted to Mr. Fry for our present knowledge of the insect fauna of the Hebrides, Shetlands, &c., as he at one time liberally supported professional collectors in their expeditions to these remote portions of the kingdom, and so fostered an interest which subsequently became more fully developed. His collection of British Lepidoptera, which comprised many local and rare species, was disposed of at Stevens's, March, 1896 (Entom. xxix. 164). Deceased was the well-known photographer of Kensington. He was about fifty-seven years of age.

THE ENTOMOLOGIST

Vol. XXX.] JUNE, 1897. [No. 409.

ON THE GEOGRAPHICAL DISTRIBUTION AND POST-GLACIAL DERIVATION OF THE PALÆARCTIC AND NEARCTIC ALPINE RHOPALOCERA FAUNAS.

By W. Harcourt-Bath.

In studying the intricate and complex themes which constitute the subject-heading of the present essay, a good deal will be gained from obtaining a preliminary insight into the theories of those botanists who have contributed treatises on the distribution and derivation of the alpine floras in the extensive regions under consideration.

The geographical and vertical distribution of the Rhopalocera in a very great degree is so intimately connected with the distribution of their pabula that it is reasonable to suppose they have closely followed the various migrations of the flora upon which they are so dependent, both antecedent to and after the termination of the glacial period. It follows therefore that, in order to intelligently comprehend their present distribution, as well as their post-glacial derivation, we must possess a certain knowledge of the closely kindred science of phyto-geography.

We will first of all take a glance at the geographical distribution of the alpine Rhopalocera fauna which exist at the present day upon the different and diverse mountain systems in the two regions under consideration. As the genus *Erebia* is the most extensive and typical group among the alpine butterflies, it will serve to illustrate with a certain degree of accuracy the facts relating to the whole.

In the Palæarctic and Nearctic Regions combined this genus numbers nearly sixty species,* all but seven or eight being con-

* These and the following figures only profess to be approximately correct.

fined to the first named, the remainder occurring exclusively in the Nearctic Area.

In the Palæarctic Region there are apparently six principal centres of distribution, three of them being situated in Europe and the other three in Asia. The Alps of Central Europe constitute the metropolis or headquarters of the alpine Rhopalocera fauna, containing in the genus *Erebia* alone as many as twenty-five species, that is, nearly one-half of the species inhabiting the whole of the northern hemisphere. On either side of them we have the Pyrenees and the Carpathians, containing about twelve and eleven species respectively; then there is a great gap until we arrive in Western Siberia, in the neighbourhood of the Thian Shan, with about eleven species; and the Altai and Amur, tending in a north-easterly direction, and containing respectively about fourteen and eleven species apiece. Both north and south of this great central series of mountain chains running through Europe and Asia the number of alpine forms of butterflies rapidly diminishes. Thus in Europe north of the Alps we have about seven species of *Erebia* in the Cevennes and Auvergne in South-eastern France, some six or seven species in the Jura, five each in the Vosges and the Riesengeberge, four in the Schwarzwald or Black Forest, four in the Hartz, and three in the Ardennes. All these mountain ranges are more or less in direct continuation of the great central alpine chain, of which they topographically constitute an integral part. In the Ural mountains, far away to the north-east on the confines of Russia in Europe and Siberia, about five species exist; in the Scandinavian mountains there are three, and in Lapland, still further north, four; while England and Scotland only possess two each, and Ireland one. Three of the species, however, which occur in the more northern limits of the distribution of the genus, are not true alpine forms. I refer to *Erebia ligea*, *E. æthiops*, and *E. medusa*, all of which are found in the Ardennes, and one in Great Britain; so that the only true alpine species which we possess in this county is *Erebia epiphron*, occurring upon the mountains of Cumberland and Westmoreland, the Grampians in Scotland, and the Connemara group in the West of Ireland. South of the Alps the same increasing paucity takes place precisely; thus in the various mountain ranges of the Iberian Peninsula there are only two or three, including one endemic form; while only one species, I believe, occurs on the elevated chain of the Sierra Nevada in the extreme south. The Apennines in Italy only contain four or five species at the outside, while the Dinaric Alps in Dalmatia and the Balkans in Turkey are in a similar predicament; two or three species only are found in the mountains of Greece, and three in Armenia and Asia Minor; while the very elevated and extensive but isolated chain of the Caucasus, in the same latitude as the Pyrenees, only possesses

five or six. There are no species whatever inhabiting the range of the Atlas in Northern Morocco and Algeria.

Turning now to the remainder of the region: in Arctic Siberia to the north about five species occur; south of the central ranges their numbers diminish to two in the Persian Highlands, and a similar number in the vast chain of the Himalayas.

In the Nearctic Region, four species only are found in the Rocky Mountains, and five in the tundras of the north; while no species of this genus are found at all in the Alleghany or Appalachian system in the east.

Now what do the foregoing facts prove? In my estimation they furnish us with an approximate estimate of the extreme distance south to which the alpine Rhopalocera fauna were driven during the climax of the glacial period, at least in the Palæarctic Region.

In preglacial times these butterflies were probably found in company with their pabula throughout the whole of the northern portion of the Europasian Area, their range extending to well within the Arctic Circle. Upon the advance of the ice-cap they retreated south until they reached the six great chains of mountains which I have already described. Many of the species were probably unable to surmount the barriers which they furnished, and consequently perished; while the majority perhaps forced their way through them by means of transverse passes and valleys, and survived in the sheltered and more hospitable areas which they would provide immediately to the south. That the butterflies did not retreat much further equatorwards I am thoroughly convinced from the fact of so few species being found upon the mountain chains to their front Moreover, we have every reason to suppose that the climatal and phyto-geographical conditions must both have been favourable to their survival in the South of Europe especially, even during the climax of the glacial epoch; so that I cannot agree with Hofmann's hypothesis that the alpine Rhopalocera fauna was entirely driven out of Europe, the greater portion into Asia, and a few into Africa, from whence he supposes they returned when the climate again became warmer.

On the other hand, I think we might fairly assume with a certain degree of safety that a few species even survived in certain favourable spots to the north of the Alps, the Pyrenees, and the Carpathians, where the land was not submerged beneath the shroud of snow and ice with which most of the north of Europe was enveloped. At any rate there are some powerful reasons for supposing that the remainder of Europe south of the mountain chains indicated were capable of affording a safe refuge to the alpine butterflies, contrary to the views expressed by Hofmann, before mentioned.

I have given elsewhere (Entom. xxix. 320–324) my reasons for supposing that the alpine Rhopalocera fauna did not retreat as far south as the north of Europe during the glacial period. That the climatal conditions were not so severe as supposed by Hofmann in order to have extirpated the whole of the Rhopalocera fauna of Europe is proved by the paucity of alpine forms which are found on the various mountain ranges in the extreme south of the Continent at the present day. The same thing must have been the case in the other portion of the Palæarctic Area, judging from the fact that there are so few species found on the Himalayas and the mountains of Northern Persia to the south.

All these facts seem to prove that the great majority of the alpine forms of butterflies therefore found a sanctuary during the climax of the glacial period to the immediate south of the three great chains of mountains on either continent.

Hofmann is most probably correct in concluding that the great bulk of the European Rhopalocera fauna have been originally derived from the Asiatic Area, though not, as he supposes, after the termination of the glacial epoch; but I think he is incorrect in imagining that the post-glacial alpine forms were not directly derived from the south. According to the investigations of Sir Joseph Hooker, the alpine flora of the Himalayas, the Alps, and Pyrenees have had remarkably little lateral connection with each other in post-glacial times. It is reasonable to suppose therefore that the alpine Rhopalocera have accordingly not been directly derived from the East in a similar manner. The butterflies being so dependent upon the plants for their pabula must have been in large measure circumscribed by their migration. On the other hand, it may be probably true that the great majority of the Austral or Lowland forms immigrated westwards from Asia at the termination of the glacial epoch.

In the case of the Nearctic Continent, fully taking into consideration the more extreme glaciated conditions which prevailed there, I think the alpine butterflies were not driven any further south than the latitude of 30° N.; but there are so few alpine forms occurring in that region that it would not be safe to draw the line so closely as one is able to do in the Eastern Hemisphere. Moreover, the physical conditions of the two regions are very different, the elevated chain of the Cordilleras running at right angles to and crossing the equator, while all the principal mountain ranges of the Palæarctic Region are in the reverse direction, that is, nearly parallel with the equatorial belt. The fact that closely allied genera to that of *Erebia* occur in the Andes of South America, and again in the highlands of South Africa, may be explained on the hypotheses that they were derived from the regions to the north during the glacial epoch; *in the former* case by means of the elevated chain of the Cor-

dilleras crossing the Equator, and in the latter by the assistance of the mountain ranges in Abyssinia and their continuance southward through Zanzibar. Whatever differences these butterflies possess at the present day in order to enable them to be placed in distinct genera from that of *Erebia* may be owing to the change effected in post-glacial times by reason of the differences experienced in the organic environment. The only other contingency I can discern is that these southern genera represent pre-glacial forms which existed in a cosmopolite condition, both geographically and vertically, in both hemispheres, as I have reason to suppose was the case with the genus *Œnis* or its immediate stirps in pre-glacial times (see Entom. xxix. 345–349).

Asia north of the Himalayas is probably the original home from whence the present alpine Rhopalocera fauna of both Europe and North America were indirectly or originally derived. In the former continent, during Miocene times, a very different fauna and flora existed to that which is the case at the present day. This fauna and flora, which was exceedingly rich according to the palæontological evidence, and partook of a subtropical nature, was, during the succeeding Pliocene period, gradually extirpated, and gave place to one which made its way from the east, more in harmony with the less genial climatal conditions which subsequently prevailed.

It was during this epoch, or the early part of the Pleistocene period which followed, that the present alpine Rhopalocera fauna of Europe or their immediate stirps was primarily derived. During the glacial period, as I have endeavoured to prove, the greater part of them survived in the more hospitable regions in the neighbourhood of the Mediterranean, the lowland forms only seeking a shelter further south still, namely, in Asia Minor and in Africa north of the Sahara Desert. It will therefore appear that Hofmann is incorrect in supposing that the whole of the post-glacial European Rhopalocera fauna have been directly derived from regions situated outside its pale. Not only am I supported in this contention from the fact of the extensive paucity of the alpine Rhopalocera in the South of Europe compared with the exceeding richness of that existing in the Alps and the Pyrenees, but also from the researches of Sir Joseph Hooker, who has proved the small amount of lateral connection also between the different mountain ranges as regards the derivation of their respective alpine floras.

Birmingham, March 17th, 1897.

CORDYCEPS ENTOMORRHIZA (Dickson), A VEGETABLE ENEMY OF *HEPIALUS LUPULINUS* LARVÆ.

By F. V. Theobald, M.A., F.E.S.

We are all well acquainted with the fungoid disease, *Empusa musca*, that often causes such havoc amongst the abundant house fly and other Diptera, but beyond this we do not often come across vegetal parasitism in insects in this country, although some seventeen insect fungi are recorded. It is only when insects are present in very large and abnormal numbers that these parasitic diseases, due to vegetable parasites, seem to appear. Recently there seems to have been a considerable increase, anyhow in cultivated areas, of the larvæ of the garden swift moth (*H. lupulinus*), especially in the south-east of England, and notably in Kent. Not until recently, however, have I been able to detect any natural enemies at work upon them, save a single species of *Anthocoris*, which I have referred to before in these pages, but which I am sorry to say has had no effect in lessening their numbers, and so helping to allay the damage the ravenous *H. lupulinus* larvæ occasion. During the latter part of February, Mr. Kennard, of Linton, in Kent, sent me a number of so-called "vegetable caterpillars," which he could not account for, and which he had noticed in his garden in certain areas on and off for the last fifteen years. These turned out to be the larvæ of *H. lupulinus* that had been invaded by a parasitic fungus of the genus *Cordyceps*. Although many of the specimens differ very much in form from the previous figures, they are undoubtedly those of the species *entomorrhiza* described by Dickson* in 1785, and subsequently noticed by Tulasne, Saccardo, Currey, Cook, and others.

Many of the larvæ showed no signs of having been invaded by a fungus, they simply remained in the soil as yellowish brown shiny bodies, like "mummies" of *Hepialus* larvæ. On cutting these open, they were seen to be full of a solid white or creamy mass of matter, which under the microscope was shown to be composed of closely compacted fine mycelial threads. This fungus completely invades the larva, and even destroys the chitinous skin, yet retains most perfectly every detail of the larval structure. A number of the larvæ were covered externally by a white or dirty-yellow coarse mycelium, especially over the anterior half of the body (figs. 1 & 2*b*); this is also noted by Cook in his 'Vegetable Wasps and Plant Worms.' Others, and those that are most interesting, have developed and proceeding from the side or beneath near the head the large fruit-bearing body so characteristic of the genus *Cordyceps*. This structure grows out from the buried larva into the air. It is swollen at the free end, and the stem in old specimens is deeply striated longitudinally

* *Plant. Crypt. Britt.*, p. 22, t. 3, fig. 3. Dickson, 1785.

(fig. 3); other specimens, especially before they are ripe, have smooth stems (fig. 2). This solid stem, which is variable in length, according to the depth of the larva under the ground, is sterile, the spore-producing area being the globose capitulum (fig. 1 *a*). Several specimens resembled Greville's *C. gracilis*,* which is now considered merely a variety of *entomorrhiza* (fig. 1 *b*). The

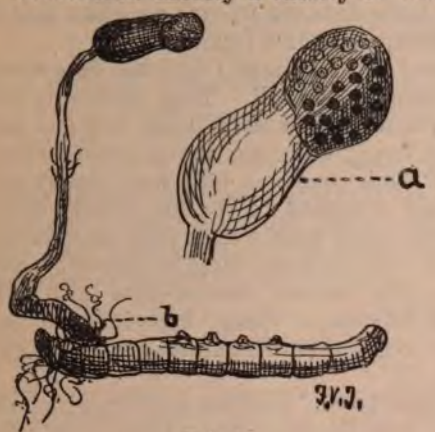


FIG. 1.

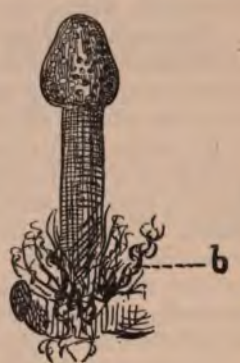


FIG. 2.

FIG. 3.

clubbed erect body is reddish brown, and in some darkened at the capitulum, others have rusty brown capitula, whilst yet others are yellowish, resembling the variety recorded by Greville from Shetland. Internally the globose head contains a number of cavities, or perithecia, when ripe, embedded in the soft stroma of the capitulum. Each cup-shaped perithecium opens to the exterior by a small round aperture, when the spores contained in them are ripe. There are eight thread-like filaments in each perithecium, which break up into a number of oblong spores. These spores are then passed out of the openings on to the soil and in the air, a

* Scot. Crypt. Flora, pl. 86.

necessary item in the distribution and increase of this parasite. The "fruits" last for a considerable time, but shrivel up when dried, and decay away from the "mummy" larva below long before the larva becomes disintegrated. Sometimes the parasitised larvæ lie flat in the ground, but the majority, especially those with the fruit-bearing body, are at right angles to the surface of the soil. One some distance from the surface had the stem quite white, much bent, and three inches long.

Through the kindness of Mr. Kennard I had the opportunity of examining these creatures in the soil. They were only to be found round peony roots, and seldom more than two feet away from the plants, although living *lupulinus* larvæ could be found in all parts. This fact of their presence only near peony roots may be of some importance in regard to the life-history of this fungus, possibly some of the early stages may take place on that plant. The life-history of none of these fungi is known. Some authorities suppose that the various *Isarias* that also affect insects are stages of *Cordyceps*. Cook, however, we must remember, seems to have found them in abundance at the roots of coltsfoot at Hitchin.

Many of these "vegetable larvæ" and the earth in which they were found were obtained with the idea that other areas might be infected with this disease. Experiments in this direction have not been altogether satisfactory, although numbers of sound *lupulinus* larvæ from other localities kept in this contaminated soil became invaded by this fungus when kept in a damp heat. Those kept in a dry heat showed no signs of being attacked.

Several other kinds of "surface larvæ" (Noctuæ) were also subjected to the same treatment, but none developed the disease, although kept under exactly similar conditions as the *Hepialus* larvæ. The ripe spore germinates rapidly if placed on a healthy larva of the latter genus, the mycelial thread entering the spiracle, and commences at once to invade the organs, leaving the alimentary canal until last. As a rule the larva seems to have reached maturity before it dies, but I have found some quite small larvæ dead in the soil.

At present our knowledge of the vegetal enemies of insects is not sufficient to enable us to carry out any experiments successfully in regard to their use as a means of keeping down an excess of insect pests. The only good results attending such experiments have been in regard to *Isaria densa*,* of Giard, a parasite that has been sufficiently abundant in France to be cultivated on a large scale and sold to farmers as a means of destroying the "white grubs" of the Melalonthidæ, a family much subject to vegetal parasites, species of *Cordyceps* often being abundant on them. Some success has also attended Professor Snow's employment and distribution of the *Sporotrichum globuliferum* of Spegazzini, as an antidote for the destructive "chinch

* 'Comptes Rendus,' p. 1079.

bug" in the States There seems some doubt, however, about the identity, &c., of the fungus employed in the latter case. Before any really successful work can be done in this subject, if it is to be done, we must know a great deal more of the life-history of the parasitic insect fungi than we do at the present time.

Wye Court, Wye, April 2nd, 1897.

ON A NEW SPECIES OF *PAPILIO* FROM UGANDA.

By the Hon. Walter Rothschild.

Papilio mimeticus, sp. nov.

This most remarkable butterfly is closely allied to *Papilio rex*, Oberth.; but while that species is almost the exact mimic of *Melinda formosa*, Salv. & God., *Papilio mimeticus* mimics *Melinda morgeni mercedonia*, Karsch.

♂ *Upper side.*—Fore wings: differ from *P. rex* in having the basal area deep chestnut instead of orange-rufous; in this chestnut area is a longitudinal pale streak behind cell, not present in typical *P. rex*. The creamy spot near apex of cell is half obliterated. The cream-coloured discal spots are much smaller, and four in number instead of seven; those between veins four and six and the one between veins seven and eight being absent. The submarginal spots are much smaller. Hind wings: basal white spots much smaller, the first one before the cell almost obliterated by black scales. The fourth discal spot between veins two and three reduced to a tiny line; of the remaining discal series only one is present; those between veins three and six absent; that one between veins six and seven reduced to a mere dot. The double row of post-median spots much reduced in size. One of the most striking differences, however, between *P. rex* and *P. mimeticus* is that while in *P. rex* the ground colour of the hind wings is uniform black, in *P. mimeticus* the disc of the wing is dull chestnut, this colour extending along the abdominal margin to near apex of vein.

Under side shows the same differences as above, in addition to which the two anterior white marginal spots are absent. The two discal spots between veins four and six, though much reduced in size, are also present. On the hind wing the first basal creamy patch has no black scaling, and there is an additional discal creamy spot between veins five and six. Also the chestnut disc of hind wings is not so distinct as on the upper side. Oberthür, in his original description of *P. rex* (Bull. Soc. Ent. Fr. 1886, p. 114), says: abdomen black above, white on sides and below; but in my specimen of *P. rex* from Uganda Protectorate the under side is black with a narrow but distinct median white line, and in this agrees entirely with *P. mimeticus*.

Hab. Msarosaro, Uganda, December 20th, 1896.

This is the choicest capture of a very fine collection sent me by Dr. Ansorge, whose care in labelling and collecting ought to prove a lesson to all entomologists.

ON THE GENUS *GYMNOPLEURUS*, Illiger; WITH A LIST OF SPECIES AND DESCRIPTIONS OF TWO NEW GENERA.

By John W. Shipp.

(Concluded from p. 135.)

Probably *virens*, Erichs, will be found to be synonymous with *lævicollis*, Cast.; but I have not thoroughly satisfied myself yet on this point.

Wahlbergi, Boh., is not quite distinct from *splendens*, although regarded as such by some authors. It is, however, a good variety of *splendens*.

I have placed *thoracicus*, Har., as a var. of *ignitus*, Klug., as I have seen varieties which are intermediate between the two, and I only regard *thoracicus* as the extreme highly-coloured form of *ignitus*.

The existing genus may be further divided as follows:—

A. Species having the posterior angles of thorax produced into a distinct obtuse point, and having the basal half of the lateral margins of thorax strongly emarginate and slightly reflexed. Body generally flatter. First segment of abdomen with the side margins straight or slightly convex, edged with a very strong longitudinal carina. Frontal carinæ never extending past the disc of head - - - *Paragymnopleurus*, Shipp.

B. Species having the posterior angles of thorax blunt, basal half of lateral margins of thorax bicarinate. First segment of abdomen concave, with no marginal carinæ extending the whole length; the carina being broken and evanescent in the centre. Frontal carinæ produced at the base of head, convergent.

a. Frontal carinæ always visible. Epipleura of elytra not produced into a spine near the humeral angles - - - - *Gymnopleurus*, Ill.

b. Frontal carinæ obsolete or nearly so at base of head. Epipleura of elytra produced into a short sharp spine near the humeral angles. *Spinogymnopleurus*, Shipp.

Paragymnopleurus, n. g.

Clypeus dentate and slightly reflexed in front, with the edge split into six teeth, the basal two mostly obsolete, or with the front produced and sharply cleft. Frontal carinæ only reaching the centre of the head; sides produced so as to almost divide the eyes. Labial palpi 3-jointed; the first very large and broad, the second smaller, and the apical joint very small and rounded. Labial palpi and labrum very hairy. Maxillary palpi 4-jointed:

basal joint very small, rounded; second joint longer; third, half as long as the second; and the apical joint swollen in the middle, and as long as the other three. Mandibles membranous. Antennæ 9-articulate, the first joint having the base produced and narrowed almost to a point at the junction with the head; the last three forming the club. Thorax more or less trapezoidal; anterior portion narrow, with the angles acute; lateral margins curved outwards, with the basal half strongly emarginate. Posterior angles produced to a distinct point, with the posterior margin slightly curved; a deep cicatrix on each side near the lateral margins. Base of elytra as wide as thorax; humeral angles pronounced; lateral margins very strongly sinuated just below the humeral angles. Epipleura of the elytra scarcely visible, except at the base; apical prominences generally pronounced, with the apical angles very acute. Dorsal surface of the first, second, and part of third distinct in the elytral sinuation; pygidium triangular. Metasternal keel rather prominent. Anterior tibiæ with three sharp teeth at apex of exterior margin, the rest of the margin being serrated. The apical spine is broadly bispined in the males. Anterior femora with a small but distinct tooth or tubercle in the centre of the longitudinal carinæ. Spurs at the apices of the intermediate and posterior tibiæ not soldered. Posterior tibiæ rather strongly curved inwards at extremity, with each of the longitudinal carinæ distinctly serrated, obliquely truncated at apex.

Type of the genus, *sinuatus*, Fb.

The following may be referred to *Paragymnopleurus*:—*assamensis*, Waterh.; *melanarius*, Har.; *morosus*, Fairm.; *azureus*, Fab.; *splendens*, Cast.; *latus*, Hope; &c.

Gymnopleurus, Illiger.

Clypeus not so sharply dentate, mostly only cleft in centre, sometimes 4-dentate. Frontal carinæ extend to the base of head, and convergent. Trophi the same as in *Paragymnopleurus*, except that the basal joint of the labial palpi is always much narrower and more rounded. Labrum not contracted towards apex. Thorax and anterior margin contracted, angles acute, sides rounded, posterior angles not prominent, almost obsolete in some species; posterior half of lateral margins bi-emarginate. Basal portion of elytra hardly as wide as thorax; elytral sinuation strong. Epipleura of elytra obsolete, the lateral margins being vertical and widely bicarinate the whole length; rather strongly truncate at apex. Dorsal surface of the first segment of the abdomen not visible, the carina meeting with the margin of the elytra; the exterior portion of the first segment of the abdomen visible is the sides, which are rounded, and not carinate on the outermost portion. The second segment has the dorsal surface visible, and is carinated on the exterior portion,

when the carina becomes evanescent; the carina then runs to the pygidium, which is triangular, with an obtuse apex. Mesosternal keel rather pointed. Anterior tibiæ with three teeth on exterior margin, and with the apical spine obtusely pointed in the males. Anterior femora with a small tubercle in the apical third. Intermediate and posterior tibiæ as in *Paragymnopleurus*, but rather shorter; tarsi laterally compressed.

Type of the genus, *G. geofroæ*, Fuessl.

The following may be referred to the genus *Gymnopleurus* as restricted:—*flagellatus*, Fab.; *sturmi*, Macleay; *aciculatus*, Gebler; *lacunosus*, Klug.; *fulgidus*, Oliv.; *olivieri*, Cast.; *ignitus*, Klug.; *bicolor*, Latr.; *corruscans*, Wied.; *cœlatus*, Wied.; *kœnigi*, Fab.; &c.

SPINIGYMNOPLEURUS, n. g.

Much the same as *Gymnopleurus*, but differs in having the anterior tibiæ shorter, and the teeth on the exterior margins wider apart. Frontal carinæ scarcely visible to base. The posterior angles of the thorax are terminated by small tubercles. The lateral carinæ of the first segment of the abdomen runs from near the humeral curve towards the centre of the elytra and meets the upper carinæ, which runs round the margins of the elytra. The extreme posterior portion of the first segment of the abdomen is simply carinate, whilst the anterior portion is bicarinate. The second segment is rounded at the sides, with the carinæ reflexed close under the lateral margin of the elytra. The lateral margins of the elytra are similar to *Gymnopleurus*, except that they have a sharp spine at the curve opposite the humeral prominences, just as the sinuation begins. This spine is slightly pointing outwards, and is situated on the extreme margin.

Type of the genus, *tristis*, Cast.

The following may be referred to this genus:—*plicatus*, Fairm.

NEW SPECIES OF SOUTH AMERICAN EUMOLPIDÆ.

By MARTIN JACOBY, F.E.S.

CHALCOPLACIS GIGAS, n. sp.

Metallic violaceous-blue; the basal joints of the antennæ fulvous; head distinctly, thorax finely and closely, punctured; elytra semi-regularly punctate-striate. Length, ♂, 3 lines, ♀, 4½ lines.

Of broad, subquadrate-ovate shape, entirely dark blue; the head rather strongly but not closely punctured, slightly transversely depressed between the eyes; clypeus more strongly punctured, its anterior edge concave; the antennæ not extending to the middle of the elytra, the basal joint blue above, the following two joints fulvous,

the rest black, third and fourth joints equal, terminal joints thickened; thorax in the male at least three times broader than long, the sides strongly rounded and widened at the middle, the anterior angles slightly produced outwards, the surface finely and rather closely punctured, the interstices at the sides slightly wrinkled and with a rather obsolete fovea; scutellum much broader than long; elytra not wider at the base than the thorax, with a short transverse depression below the base, scarcely more strongly punctured than the thorax, the punctures arranged in closely approached semi-regular rows, distinct to the apex; below very sparingly pubescent; femora rather swollen.

Hab.—Cayenne.

Of this, the largest species of the genus, I possess a male and female specimen; the latter is of almost double the size and width, but does not differ in other respects; both sexes are of a much more ovate shape than is generally the case with species of this genus.

Chalcophana impressipennis, n. sp.

Dark rufous; the antennæ (the basal three joints excepted), the apex of the tibiæ, and the tarsi blackish blue; thorax irregularly punctured; elytra finely punctate-striate, metallic cupreous or green, margined with fulvous at the sides, the disc with two or three short costæ below the base, the latter with oblique deep humeral depression. Length 4½–5 lines.

♀. Head rather finely and sparingly punctured at the vertex, the middle with a fovea, more strongly punctate; clypeus subquadrately elongate, smooth, bounded behind by a deep groove; labrum and palpi rufous; antennæ long, bluish black, the basal three joints rufous; thorax strongly narrowed in front, the anterior angles acutely produced, the sides strongly rounded, the disc irregularly impressed with larger and smaller punctures; scutellum rufous; elytra much pointed posteriorly, cupreous or green, the lateral margin and the epipleuræ narrowly rufous, the shoulders bounded within with a deep, oblique, longitudinal depression, followed by two or three very short costæ at the sides, the depression deeply punctured, the rest of the disc finely and evenly punctate-striate, the rows not geminate and rather distant, the punctures finer towards the apex, the suture raised at the posterior half; under side and legs rufous; the apex of the tibiæ and the tarsi blackish blue, clothed with yellowish pubescence; breast and abdomen impunctate; the prosternum smooth, rather broad.

Hab.—Bolivia.

I only know the females of this species, which is one of the largest of the genus and distinct on account of the deep intra-humeral groove of the elytra and the short costæ below this groove at the middle of the sides; but whether this species is but the female of *C. suavis*, Har., which is described as having neither basal depression nor costæ, it is impossible to say, since the author does not mention what sex he had before him.

CHALCOPHANA BOLIVIANA, n. sp.

Fulvous; the antennæ (the basal two joints excepted), the tibiæ, and tarsi black; thorax impunctate; elytra dark bluish, the apex greenish, finely punctate-striate, the sides with three short costæ at the middle. Length 4 lines.

♀. Head nearly impunctate, with a few fine punctures only, the middle with the usual fovea; clypeus broad, convex, impunctate; antennæ black, the basal two joints fulvous, terminal joints distinctly thickened; thorax strongly transverse, the sides rounded, the anterior angles thickened but not prominent, the surface nearly impunctate or with some extremely fine punctures, fulvous; scutellum of the same colour; elytra rather finely punctured in single rows, which become geminate here and there below the middle, below the base is a distinct depression which is followed by three short costæ, the shoulders are acutely raised as well, and a longer costa below them extends to the apex at the sides; under side and femora fulvous; the entire tibiæ and tarsi black.

Hab.—Bolivia.

Of this species, of which three specimens are contained in my collection, I also know only the female; the elytra are of rather peculiar coloration, bluish anteriorly, greenish near the apex. The species may be known by the nearly impunctate head and thorax and the black tibiæ and tarsi.

(To be continued.)

NOTES ON THE SYNONYMY OF NOCTUID MOTHS.

By ARTHUR G. BUTLER, Ph.D., F.L.S., &c.

(Continued from vol. xxix. p. 284.)

ABROSTOLA, *Ochs.*

Walker's second species of *A. ovalis*, Guen., is *A. asclepiadis*, and (on turning up the reference to the register of accessions) I find that it is a European specimen purchased from Becker. Walker's carelessness in making certain of the localities recorded in his catalogue has been a source of considerable confusion. *Inguridia abrostoloides* is an *Abrostola* near *A. urentis*.

EURHIPIDÆ.

INGURA, *Guen.*

Ingura abrostoloides.

Ingura abrostoloides, Guenée, Noct. 2, p. 311, n. 1119 (1852).
Edema producta, Walker, Lep. Het. 5, p. 1031, n. 4 (1855).
United States. In Coll. B. M.

Abrostola devincta, Walk., is allied to this species, and still more closely to *Ingura fuscescens*, Walk., which is a variety of *I. lunodes*, Guen., without the whitish apical spot.

Ingura lunodes.

Ingura lunodes, Guenée, Noct. 2, p. 310, n. 1117 (1852).
Edema fuscescens, Walker, Lep. Het. 5, p. 1031, n. 5 (1855).

Rio Janeiro, Honduras, St. Domingo, and Jamaica. In Coll. B. M.

"*Ingura subapicalis*" and *I. cristatrix* differ from typical *Ingura* in their upright slender palpi; those of the New World species being broad, thickly scaled, and porrected. The Indian species I have called *Callingura*.

EUTELIIDÆ.

EUTELIA, *Hübn.*

Eutelia dentifera.

Eutelia dentifera, Walker, Lep. Het. Suppl. 3, p. 818 (1865).
E. pulcherrima, Grote (see Check-List, p. 33, n. 816).

United States. In Coll. B. M.

It is possible that Grote's name may have priority; but as his Check-List gives no references I cannot settle the point. I leave it to those who know where to look for the description.* *E. exquisita*, Saalm., appears to be the same as *E. bowkeri*, Feld. Both figures are bad, but Saalmüller's is by far the worse of the two. We have *E. bowkeri* from Kilima-njaro.

MARASMALUS, *Grote.*

Marasmalus inficita.

Eutelia inficita, Walker, Lep. Het. Suppl. 3, p. 818 (1865).
Marasmalus histrio, Grote (see Check-List, p. 33, n. 818).

United States. In Coll. B. M.

TARGALLA, *Walk.*†

Cryassa, Walk., and *Penicillaria* (part), Guen.

Targalla bifacies.

Cryassa bifacies, Walker, Lep. Het. xv. p. 1745 (1858).
Eutelia impleta, Walker, *l. c.*, Suppl. 3, p. 822 (1865).

Ceylon. Types in Coll. B. M.

* These notes were all written before the publication of Prof. Smith's useful Catalogue.—A. G. B.

† In this genus the antennæ are simple in both sexes.

Targalla repleta.

Eutelia repleta, Walker, Lep. Het. Suppl. 3, p. 821 (1865).
E. plusioides, Walker, *l. c.*, p. 822 (1865).
Ceylon and S. India. Types in Coll. B. M.

Targalla palliatrix.

Penicillaria palliatrix, Guenée, Noct. 2, p. 305, n. 1113 (1852).
Targalla infida, Walker, Lep. Het. xiii. p. 1008, n. 1 (1857).
Penicillaria ludatrix, Walker, *l. c.*, xv. p. 1773 (1858).
Java, Moulmein, and Ceylon. Types in Coll. B. M.

PENICILLARIA, *Guen.*

Penicillaria nugatrix.

Penicillaria nugatrix, Guenée, Noct. 2, p. 303, n. 1110 (1852).
Eutelia simplex, Walker, Lep. Het. Suppl. 3, p. 824 (1865).
Almorah and Jubbulpore. In Coll. B. M.

Walker simply noted the Almorah specimens as from North India. His type of *Eutelia simplex* is a broken and somewhat rubbed example, without any locality label.

NOTES AND OBSERVATIONS.

THE COMMA BUTTERFLY OF AMERICA.—In "Some Miscellaneous Results of the Work of the Division of Entomology" * Mr. Howard, the entomologist, gives an interesting account of two species allied to our *Vanessa* (*Polygonia*) *c-album*. These are considered under the heading "Hop Merchants," a term generally used in reference to the chrysalids, but sometimes applied to the imagines also. He says, "An interesting superstition holds among hop-growers, to the effect that when the golden-spotted chrysalids are plentiful the crop will be good and the price high, while if the silver-spotted ones are plentiful and the golden ones are scarce the price will be low."

The two species dealt with are *Polygonia interrogationis*, Godart, and *Polygonia comma*, Harr. The last named is the smaller species, and almost exactly identical with our Comma butterfly.

In his remarks on the habits and natural history of *P. comma*, Mr. Howard states: "In the hop-growing regions of New York the insect is double-brooded, the butterflies hybernating and flying in the early spring, living on into the latter part of May and even June. The first brood of caterpillars lives, in the main, upon elm; and young elm trees recently set out are frequently injured by the loss of almost their entire foliage in the spring. . . . . Aside from the elm, this

* Bulletin No. 7, New Series. U. S. Department of Agriculture. Division of Entomology. Washington. 1897.

early brood may also feed upon nettle and false-nettle. The adult butterflies developing from the first brood of larvæ begin to breed at the end of June, and fly until late in August. In hop-growing regions the majority of the eggs of this set of butterflies are laid upon hop-vines. The resulting caterpillars feed well on in August, and the butterflies which are to hybernate make their appearance from the latter part of this month until the latter part of September. They enter hybernating quarters almost immediately, since they are rarely seen in October. . . . . The hybernating form has been called *harrisii*, and the summer form *dryas*. The distinction between the two forms is not as marked as with the preceding species (*P. interrogationis*), nor is the relegation to distinct broods as marked. . . . . In its southern range the species is three-brooded, the first brood being composed of *dryas*, the second of both forms, and the hybernating brood of *harrisii* only."

The ova of *P. comma*, like those of *P. interrogationis*, are deposited in depending columns or chains, varying in number from two to nine eggs. "Frequently several of these columns will be found upon a single leaf, usually upon the under surface, but occasionally upon the stem or upon the tendrils. Although frequently a large number of eggs are thus found upon the same leaf, the caterpillars are in no sense gregarious. On hatching they almost invariably migrate to other leaves, and each one lives singly. At first it feeds without concealment on the under surface of the leaf, then it begins to draw the outer edges together by silken threads as a sort of protection, apparently, from the daylight, as it feeds mainly at night. The young larvæ are dark-coloured and nearly black, but grow lighter with successive moults."

Seeing how very much alike are the imagines of the English and American Comma butterflies, it seems remarkable that the method of egg-laying and the habits of the larvæ should be so very different in the two species. Mr. Frohawk, in his very detailed account of the life-history of *V. c-album* (Entom. xxvii. pp. 257–262, 287–289), says, "The ova are laid singly, and principally on the upper surface of the leaf, and generally many upon one leaf" (*l. c.* p. 258). Then, with regard to the habits of the larvæ, he states (*l. c.* p. 262) that they are gregarious, "living in small companies, but sometimes many will crowd upon a certain leaf."—R. S.

Sesia tipuliformis an Injurious Insect.—Among other interesting articles dealing with injurious insects in the March issue of the 'Journal of the South-Eastern Agricultural College' is one on *S. tipuliformis*, an insect that is not always well represented in collections. It would appear, however, that in some places at least the species is common enough to be regarded as a pest. Under the name "Currant Borer," it is well known to fruit growers, and seems to be dreaded by them for the havoc it creates among all kinds of currant bushes. Certain suggestions are advanced, as being more or less likely to prevent attack or to clear out the insect from any place it may be in possession of. Probably a good plan would be to invite one or two practical entomologists to visit the infested plantation about the end of April or beginning of May, when the *Sesia* is in pupa; the prunings

would be removed and effectively disposed of, at any rate the insects produced from them would never have a chance to renew their attack.

Gynandromorphous Lepidoptera.—Herr Oskar Schultz has published a list of Gynandromorphous (Hermaphrodite) Macro-lepidoptera of the Palæarctic fauna. He refers to the literature of the subject, and gives particulars of instances which were not previously known or recorded. The 366 (123 species) enumerated are distributed among the families as follows:—Rhopalocera, 151 (48 species); Sphingidæ, 43 (39 species); Bombycidæ, 134 (39 species); Noctuidæ, 11 (9 species); Geometridæ, 27 (16 species).

Attention may also be called to "Die Lepidopteren-Zwitter meiner Sammlung." This is a list of 161 gynandrous specimens in the collection of the author, Herr Max Wirthott, of Breslau; there are four plates, on which 72 of the examples are represented. Since the year 1761 about 400 cases of gynandromorphism in Lepidoptera have been made known.

Uniformity in Setting Lepidoptera.—With reference to this subject, one of the reasons put forth by some of your correspondents in favour of the adoption of the foreign method of setting, in substitution for that more generally in use in this country, appears to be that those entomologists who study continental as well as British Lepidoptera cannot do so conveniently, on account of the unsightly appearance given to their collections by having a mixture of high- and low-set insects in their cabinets. This is undoubtedly a drawback to those of us who are fortunate enough to be able to extend their studies to the continental species, but surely the difficulty can be got over by having separate collections of British and continental specimens—all those insects captured abroad being kept in a distinct collection from those captured in this country. This might not perhaps afford *quite* the same convenience in comparing British and foreign examples of the same species, but surely the extra trouble of comparing two series of insects in two separate cabinet-drawers, instead of in the same drawer, would be trivial. Whether the high or low method is the best is, and always will be, a matter of opinion. Each very likely has its own advantages over the other. To my mind the "happy medium" of having the insect set at the centre of the pin, as described by Mr. Tunstall (Entom. xxix. 300), is the best. This method keeps the insect well off the bottom of the drawer, without giving it the "painted cardboard" appearance which is always suggested to my mind on looking at a specimen set in the strict continental style. I rather fancy this "happy medium" has been very largely adopted in this country by most of our leading entomologists (I mean those who collect only British species and who have not taken up the continental system of setting), and it is erroneous nowadays to suppose that "British setting" means allowing the insects to rest on the bottom of the drawer of the cabinet. Uniformity in the setting of British specimens is most desirable for very many obvious reasons, and if the leading entomological societies of this country would act on the lines suggested by Mr. Tunstall, they would be doing an excellent work; but I cannot see the necessity for the adoption of the continental method.—H. *Ainslie Hill*; 9, Addison Mansions, Kensington, W.

I did not reply to the criticism on my remarks before, because I wanted to see the opinions of others. As, however, so few have taken part in the discussion, I can only come to one conclusion, *viz.* that British collectors do not intend to adopt the flat unnatural method. Mr. Jacoby has not a word to say in favour of the unnatural style, but only abuse for the natural style, — the "exploded idea of looking natural" Mr. Jacoby chooses to call it,—and he says that putting insects on pins is not natural. He says our insects rest on the bottom of the cases. In old collections it might have been so. Certainly no modern collections are so set. I can quite understand any foreigner, accustomed to see (in his own country) insects set in any particular way, thinking therefore such way must be the proper one, but that is no reason why it should be so. Yes, I distinctly remember seeing the cases of Mr. Elwes exhibited at the Entomological Society a few years ago, and remarking to a neighbour how unlifelike and wooden they looked, and he quite agreed with me. Mr. Jacoby wishes to know the advantage of the "natural" method. It speaks for itself, I should think, in being more lifelike, coming as near Nature as possible.—W. Dannatt.

[We fear that some of our correspondents are rather wandering from the main subject in this discussion. The point appears to be—Is it possible for lepidopterists in this country to arrive at some understanding with regard to the preparation of specimens for the cabinet, so that there may be something more nearly approaching uniformity in setting than exists at present? The high-flat system has been advocated because it seemed to those who have adopted it to possess advantages over any modification of the English method. If, however, the continental style does not commend itself, one is not compelled to accept it. In fact, one is not bound to set one's specimens in any particular style, or even to set them at all. The whole thing is entirely a matter of individual fancy, and so long as exchange negotiations are not entered upon, no one will venture to object. When, however, it is considered desirable to extend a collection by exchange, the question of uniformity in setting will present itself, and it seems only reasonable to assume that the convenience of the minority will have to give way to the requirements of the majority.—Ed.]

Temperature and other Experiments on Lepidoptera.—At the Royal Society's Soirée, which took place on May 19th last, Dr. Standfuss exhibited some of the remarkable specimens he had obtained by the application of artificial temperature, either during the pupal stage of a species, or throughout its metamorphoses from the egg. In another series there were examples of the results of crossing between the typical forms and well-defined varieties of a species. All these most interesting, and in some cases extraordinary, specimens, together with a selection of the artificial temperature forms bred by Mr. Merrifield (also exhibited at the soirée), are now to be seen in one of the table-cases in the insect gallery at the Natural History Museum, South Kensington. We would strongly advise all who are interested in the variation of Lepidoptera to take an early opportunity of seeing this very instructive exhibition, which will probably only be accessible, in its present complete form, for a limited period.

Hybrids.—Any information, either original or previously published, respecting hybrids, will be most acceptable to Mons. A. Suchetet, Chateau d'Antiville, par Bréauté (Seine Inférieure), who is engaged upon a book dealing with hybrid insects, fishes, and reptiles.

CAPTURES AND FIELD REPORTS.

Acronycta alni at Trefriw, North Wales.—A fine specimen of this moth emerged from the pupa this evening in my breeding-cage. I obtained the larva on the 5th of last August, sitting in a semicircular position on an alder leaf. I put a small piece of rotten wood in the cage, into which it bored its way in about three days afterwards, closing up the hole in such a way that it was almost impossible to detect it. The gallery is just two inches long, the pupa and shrivelled-up skin of larva occupying the farthest half.—Francis D. Bland; Trefriw R.S.O., North Wales, May 17th, 1897.

Abraxas grossulariata bred in December.—On October 15th last, my attention was called to a larva of *Abraxas grossulariata* in the last stage. This I took indoors; it pupated on Nov. 19th, and the moth emerged on Dec. 24th. No doubt this was a case of partial second brood, but had I left the larva in the garden it would probably have died instead of pupating. On the 14th inst. I took a nearly black larva of this species, showing only traces of the usual white and orange markings.—Alfred Sich; Villa Amalinda, Burlington Lane, Chiswick, May 17th, 1897.

Lepidoptera in 1897.—Looking at the fact that an exceptionally small number of items for the "Captures and Field Reports" section have been received, it would appear that either collectors are very busy, and so leaving their records for a later period; or that insects are scarce, and consequently there is little to chronicle. I am rather inclined to suppose that the entomological season so far has not been altogether brilliant. Last Saturday (May 15th) I put in a few hours in the afternoon at Northwood, in Middlesex; the only Lepidoptera that I observed were a few specimens of *Syrichthus malvæ*, and one or two species of Tineæ. Very few larvæ were obtained, and with the exception of *Taniocampa populeti*, which were very small, I failed to meet with any of the species I have found at the same time and place in other years.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W., May 20th, 1897.

Velia currens, *Fabr.*, in Scotland.—I have in my collection three examples of the macropterous form of *V. currens;* they were taken during the month of August, 1893, at Musselburgh from the river Esk, where this form was quite common.—R. M. Leake; 15, Alleyn Park, W. Dulwich, S.E., May 2nd, 1897.

Acherontia atropos at Beverley, 1896–7.—During the autumn of last year about thirty larvæ and pupæ of this moth were found in and around Beverley; but only six have produced perfect insects so far. These were all reared by S. Copeland; five emerged in October, while the sixth delayed appearance until April 17th; all having been treated the same way, and kept in the house. Several collectors have lost pupæ;

D. Malton obtained seven, Dr. Savage four, R. Cherry one, and myself five, but all failed to come to perfection. Other collectors have single pupæ still living—Mrs. Hewetson, Mrs. Bruce, Mr. R. C. Hugill, and Mr. T. Dixon. They have for the most part been kept either under soil occasionally damped, or on the soil covered with moss which has been kept slightly damp. Some larvæ pupated on the top of the soil, others under it. I should be glad to know whether this has been a correct method of forcing them, and whether any have been known to be reared without being damped; also what bad effect gentle handling has upon the pupæ.—(Rev.) A. NEWENHAM; Beverley, Yorkshire.

[The treatment of the pupæ of *A. atropos* has frequently been referred to in recent volumes of the 'Entomologist'; see *ante*, p. 75, and xxix. p. 262.—ED.]

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*May 5th*, 1897.—Mr. Roland Trimen, F.R.S., President, in the chair. Mr. C. H. Peers, of Harrow Weald, was elected a Fellow of the Society. Mr. J. J. Walker exhibited an earwig, *Apterygida arachidis*, Yersin, new to Britain, and recently found in large numbers in chemical works at Queenborough. It had been probably imported among bones. Mr. Burr also showed a complete series of the British species of Forficulidæ. Mr. Enock showed eggs of *Stenopsocus cruciatus*, L., containing parasitic larvæ of *Alaptus fusculus*, Hal., the male of which would probably prove to be *Alaptus minimus*, Hal. Mr. Merrifield exhibited the results of temperature experiments on the pupæ of *Pieris daplidice*, *Melitæa didyma*, and other species. He thought that changes produced by abnormal temperatures might be classed as follows:—1, enhancement or diminution of intensity of colour without alteration in the form of the markings; 2, substitution of scales of a different colour, scattered or in groups; 3, imperfection in the development of scales or their pigment. Mr. Tutt showed a series of insects collected at Cannes in March, and remarkable for their early emergence. Dr. Dixey read a paper on "Mimetic Attraction," in which he dealt with the steps by which a wing-pattern, as in South American Pierinæ, could be modified in various directions so as to secure a mimetic result, and with the theories of mimicry put forward by Bates and Fritz Müller. Mr. Blandford also exhibited and discussed series of homœochromatic and mimetic Neotropical species of butterflies, chiefly of Heliconiidæ and Heliconioid Danaidæ. The discussion was continued by Prof. Poulton, who showed similar groups of several genera, remarkable as having been collected and sent to England as examples of a single species, and by the President, and it was ultimately adjourned to June 2nd.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*April 22nd*, 1897.—R. Adkin, Esq., F.E.S., President, in the chair. Mr. Malcolm Burr, Bellagio, East Grinstead, Sussex, was elected a member. Mr. Waters exhibited a number of the "casts" of both the owl and the rook. These *rejectamenta* were examined, and the former contained bones and starlings' skulls, &c., while the latter contained corn-husks and beetles' wings mainly. Mr. Barrett, the only known

Scottish specimen of *Colias hyale*, captured in Dumbartonshire by Mr. Mallock. He also exhibited a var. of *Crymodes exulis*, taken by Mr. Percy Bright in Unst, which form was at one time considered a distinct species and termed *Hadena maillardi*, together with the same species from Rannoch and Iceland. Mr. Auld, a varied series of *Cucullia chamomillæ* from Lewis. Mr. Robt. Adkin, a series of *Hybernia marginaria* (*progemmaria*), the progeny of a pair received from Mr. Hewett, of York. About sixty per cent. of the males were of the black form and followed the parents, while the whole of the females were dark. He also made remarks upon the scaling and pigmentation. Mr. Mera, a larva of *Callimorpha hera* which had fed all the winter, and was in its last stage.

May 13th.—Mr. R. South, F.E.S., Vice-President, in the chair. Mr. Stanley Edwards exhibited a small scorpion, which he had captured at Digne, in the south of France, together with a specimen of the field cricket, from the same locality. He also exhibited a pupa of *Charaxes jasius*, and stated that Dr. Chapman had sent him larvæ of this species from Cannes earlier in the year. Mr. Tutt made remarks upon the condition of vegetation and insect life as observed by Mr. Edwards and himself during a week's holiday at Easter in the south-east of France. The weather there was superb, but yet the vegetation was, at 1900 ft. above the sea, but little in advance of that in the south of England. With the development of insect life there was no comparison, for in one day he had seen no less than fifty-two species of Lepidoptera. In the corner of one field were to be seen all our three Melitæas flying together. Mr. Lucas exhibited a mature and two immature specimens of *Leucophæa surinamensis* = *indica*, an Indian species of cockroach, taken in the forcing pits at Kew Gardens. Mr. Montgomery, young larvæ of *Apamea ophiogramma* in the stems of the ribbon-grass, and contributed notes on its habit of leaving its old burrow and selecting a new stem. Mr. South, a series of *Amphidasys strataria* (*prodromaria*), and remarked on their small size, while the larvæ had been unusually large. Mr. Auld, a varied series of *Boarmia cinctaria* taken this year in the New Forest. Mr. H. Moore, specimens of the rare insect *Pseudopontia paradoxa*, with drawings showing its anomalous venation, its bifid scales, and the isolated position of each scale on the wing-membrane. He contributed notes on the species, which he said had come from Mombasa, East Africa, and about the position of which there was the widest divergence of opinion; some authorities placed it in the Rhopalocera, some in the Geometers, and some among the Bombyces. Mr. Turner, on behalf of Mr. Clarke, of Reading, specimens of *Tephrosia crepuscularia* taken in the wood which Mrs. Bazett had said did not produce the species. Mr. Tutt read a paper, sent by Prof. Grote, M.A., entitled "Autumnal Notes from the Butterfly Camp by the Shores of Lake Erie."—Hy. J. Turner, *Hon. Report Sec.*

Cambridge Entomological and Natural History Society.—*April 30th*, 1897. The President in the chair. Dr. Sharp called attention to a peculiar structure which he detected some years ago in *Chrysiridia madagascarensis* better known as *Urania rhipheus*. On each side of the second abdominal segment there is an ear-like opening, usually much concealed by overlapping scales, giving entrance to a chamber which

extends to the middle line and forwards towards the base of the abdomen, so that a considerable space in the anterior and upper part of the abdomen is occupied by the chamber. At the anterior external part of this depression or chamber there is a second vesicle-like chamber, formed by a delicate membrane. He considered this structure to be some kind of sense organ, and thought it must be of great importance to the creature, as it occupies a large area of the abdominal region. It is independent of sex, and apparently occurs in all the members of the families Uraniidæ and Epiplemidæ. M. Oberthür had kindly supplied him liberally with dried specimens for the examination of this organ, but fresh individuals, or some well preserved in spirit, are necessary before any of the finer details of the structure can be ascertained.—L. Doncaster, *Hon. Sec.*

The City of London Entomological and Natural History Society held a successful exhibition on April 27th, at the London Institution, Finsbury Circus. Besides the members of the Society, many leading entomologists kindly contributed exhibits. Mr. J. A. Clark sent full representation of all our known British butterflies, amongst which were a long series of male and female *Chrysophanus dispar*, hermaphrodite specimens of *Dryas paphia*, *Plebeius ægon*, and *Polyommatus icarus*, and black vars. of *Limenitis sibylla*. Aberrations in Mr. C. Nicholson's Vanessids included *Pyrameis atalanta* with partial bleaching of red band on right wing, *P. cardui* with an additional white spot on fore wings, and *Aglaia urticæ* approaching var. *ichnusa*. Mr. A. W. Dennis, a xanthic *Epinephele ianira*, *Pararge egeria* female with male coloration, *Pyrameis cardui* much suffused with black, *Argynnis adippe* with median black band on all wings, *Cupido minima* under sides with spots obsolete, *Spilosoma lubricipeda* with central fascia on all wings, *S. menthastri* with spots much enlarged. Mr. Robt. Adkin, well-known British species of "Clear-wings," series of *Endromis versicolor*, *Lasiocampa quercifolia* and *L. ilicifolia*, &c.; *Camptogramma bilineata*, black forms from Kerry, banded from Shetland; banded *Thera juniperata* from Orkney; black *Amphidasys betularia* from Yorkshire; vars. of *Boarmia repandata* and *Abraxas grossulariata*. Mr. J. W. Tutt's Zygænids included *Zygæna hippocrepidis*, a species usually confounded with *Z. filipendulæ*. Amongst his Geometers were a series of aberrations of *Cidaria immanata* from Lochgoilhead, and a hybrid between *Amphidasys strataria* and *A. betularia*. Mr. W. M. Christy, *Zygæna filipendulæ* and *Z. trifolii*, with vars.; *Macroglossa bombyliformis* with scales all over the wings, only found prior to flight of imago; and *Nyssia lapponaria* with *N. zonaria* and continental relatives for comparison. Mr. C. G. Barrett, British and European Psychids, with their curious larva-cases; long and variable series of *Agrotis cursoria* and *A. tritici;* Leucaniidæ, with *Leucania favicolor*, n. sp., lately described by himself, and vars. of female spotted, the latter belonging to Mr. G. F. Mathew; and a moth from Unst, Shetland, agreeing with *Hadena maillardi* (St. Cat.), placed on the table as a form of *Crymodes exulis*, but if of specific rank would be an addition to the British list. Typical *C. exulis* and one intermediate form belonging to Mr. Percy M. Bright were also exhibited. Mr. F. J. Hanbury, Noctuæ, *Noctua festiva* var. *conflua* being largely represented, and the

Xanthiæ and Catocalæ were much admired. Mr. L. B. Prout, bred series of *Coremia ferrugata* and *C. unidentaria*, to illustrate the influence of heredity. Mr. G. Elisha, twenty drawers of Micro-Lepidoptera, of the greatest beauty as to freshness of moths and regularity of setting. Mr. D. C. Bate, larvæ of *Orgyia gonostigma*. Mr. J. Riches, larvæ of *Apamea ophiogramma* on their food-plant, variegated ribbon-grass. Mr. C. Nicholson, preserved larva of *Lasiocampa quercifolia*, showing the "lappets." Mr. S. Edwards, a valuable and immense collection of Papilioninæ from all regions. Exotic Lepidoptera were exhibited by Messrs. J. A. Clark (Morphinæ, *Atlas*, *Cecropia*, *Thysania agrippina*, &c.), A. Bacot (South African), E. M. Dudd (American), and Dr. J. S. Sequeira (Indian). The subject of "mimicry," or the assumption by persecuted species of similar or nearly similar coloration to that of species protected by scents, colours, or presumed nauseousness of flavour, from birds and animals, was well illustrated by Messrs. Watkins and Doncaster and O. E. Janson and Son. Mr. H. Heasler, Coleoptera, being the material for his "London List," which includes *Molorchus minor*, *Oodes helopioides*, *Aphodius lividus*, *Rhinonchus bruchoides*. Messrs. O. E. Janson and Son, case of Phasmidæ or stick-insects, twig-like when quiescent, a further development of the "protective mimicry" principle. Mr. W. J. Ashdown, Odonata, showing that *Anax imperator* and *Libellula quadrimaculata* var. *prænubila* can be captured in Surrey. Mr. J. A. Clark, nests of *Vespa britannica* from Forres, on fir, beech, and heather, and from New Forest on ivy and yew. Dr. J. S. Sequeira, insect products, such as silk, wax, honey, cochineal, shellac, &c. Mr. R. M. Wattson's "Life in a Pond" exhibited dragonfly nymphs, water-beetles, water-scorpions, and other inhabitants of our ponds and pools. Mr. D. C. Bate, a "cat's-eye" electric lamp for sugaring. There were also many exhibits in other branches of natural history. Mr. Fred. Enock, in his happiest style, gave a lecture on "The British Trap-door Spider." Lord Walsingham, an honorary member of the Society, visited the soirée early, and addressed the members on the value and pleasure of a study of nature. A programme of music was delightfully rendered in the course of the evening, and light refreshments were served to all visitors.—H. W. Waugh.

Nonpareil Entomological and Natural History Society.—*May 6th*, 1897.—Mr. Gurney exhibited a dwarf specimen of *Asphalia ridens*, which, besides being peculiarly marked, had been in the pupa since 1895 and just emerged. Mr. Norman, a box of finely preserved larvæ of *Saturnia carpini*, *Sphinx ligustri*, *Chærocampa porcellus*, *Dasychira fascelina*, *Calocampa vetusta*, *Zeuzera æsculi*, &c.; he also showed four bred specimens of *Deilephila euphorbiæ*. Mr. Lusby, fine full-grown larvæ of *Arctia villica*, from Willesden, and Mr. Harper, larvæ of *Arctia caia*. Four male and two female specimens of *Lycæna argiolus*, from Wood Street (taken May 2nd), were also shown by Mr. Lusby. Mr. Samson exhibited *Plusia orichalcea* from St. Margaret's Bay, *P. chrysitis* and *P. pulchrina* from Winchester, male *Lophopteryx carmelita* from West Wickham, and other insects. Messrs. Pickett and West also exhibited various species of Lepidoptera.—F. A. Newbery, *Reporting Secretary*.

THE ENTOMOLOGIST

VOL. XXX.] JULY, 1897. [No. 410.

ZYGÆNA FILIPENDULÆ VAR. *HIPPOCREPIDIS.*

WHEN I visited a certain meadow on the Hertfordshire border of Middlesex on June 12th last, *Ino statices* was worn and seemed to be almost over for the season. *Zygæna trifolii*, however, was still about and in fine condition, but much less common than when I had the pleasure of seeing it in that particular field on a previous occasion. There were no *Z. filipendulæ* with it this year, and there were no varieties worth mentioning. About a quarter of a mile distant from the *Z. trifolii* field *Z. filipendulæ* was flying in numbers, and there were also a great many cocoons and a few larvæ of the species about, the latter preparing to enter the pupal stage of their existence. It was curious to note that the cocoons were not only attached to the stems of grass and other plants, but also to posts, and even iron hurdles, which under the brilliant sunshine were really hot.

The question having been raised as to whether or not these June Zygænas of the six spot persuasion are specifically distinct from *Z. filipendulæ* which appears in July and August on chalk downs, &c., I took the opportunity of collecting a goodly sample of the imagines then on the wing, as well as a liberal supply of the cocoons. These latter, I may remark, were not always affixed to the higher parts of the stem, but were found in all kinds of positions from quite near the ground, and well concealed

among herbage, to close up to the summit of the stalk or stem, where they were of course fully exposed. As a matter of fact, some of the latter were evidently indiscreetly placed, as they offered a tempting morsel to epicures in that particular line of dainty fare, and the contents of the cocoons had been duly annexed. The cocoons placed nearer the ground, or at least among the herbage, were, so far as I could ascertain, left intact.

It is of course well known that the specimens of *Z. filipendulæ* occurring in June have been referred to *hippocrepidis* by Stephens, and there is no reason why the form that Stephens described under that name should not retain the distinctive cognomen, as it is not likely to be confused with *Z. hippocrepidis*, Hübn. Stephens's name cannot, however, apply to the June flight of the insect as a whole, because all the individuals are not of the form which he described as *hippocrepidis;* many of them on the contrary are unmistakable typical *filipendulæ*. Again, but this does not present any objection to using the name, var. *hippocrepidis* occurs among the individuals of *filipendulæ* emerging in July and August, and I have examples taken or bred in those months both at Ventnor and Folkestone.

As already mentioned, I obtained larvæ with the pupæ and imagines. I think there is no question about what species the larvæ belong to,—yellow, with two interrupted black dorsal stripes and a narrower and more interrupted black stripe on each side above the spiracles. Perhaps it would be more correct to describe the black markings as longitudinal series of spots.

The imagines are emerging from pupæ at the rate of from four to twelve per day, and in some of the cocoons the larvæ have not yet pupated, so that it is quite likely that July will be well in before the last of the moths appears. Turning to my notes, I find that in 1887 I brought some larvæ from Ventnor on June 21st, and the imagines, including var. *hippocrepidis*, emerged in July. In 1885, at Folkestone, I found *Z. filipendulæ* exceedingly abundant in the last week of August, and on that occasion I secured one of the most variable series I have been able to obtain so far, and among the specimens there were examples of *hippocrepidis*. So in the matter of dates we have June, July, and August for the variety in question, and we see that typical *Z. filipendulæ* is on the wing during the same months.

With regard to the relationship of *Z. filipendulæ* and *Z. trifolii*, I am of opinion that it is an exceedingly close one. In fact, I am inclined to suppose that the former may be a development of the latter. In other years I have seen the two species flying together, but I have never seen *filipendulæ* paired with *trifolii*. I am quite open to admit that such pairings do take place, although I am hardly disposed to accept var. *hippocrepidis* as the result.

When the whole of the imagines have emerged from the pupæ I collected and are available for study, I may have some further remarks to make. In the meantime I would call attention to the figure of var. *hippocrepidis* given above, and suggest that attention should be turned to *Z. filipendulæ* during the season, and this form noted wherever detected.

RICHARD SOUTH.

100, Ritherdon Road, Upper Tooting, S.W.
June 21st.

The following description of *Zygæna* (*Anthrocera*) *hippocrepidis*, Steph., and remarks thereon are extracted from Stephens's Ill. Brit. Entom. Haust. i. p. 109 (1828):—

"Alis anticis nigro-cyaneis, maculis sex rubris, subtus omnino confluentibus, posticis rubris margine sinuato viridi-cyaneo, abdomine immaculato (Exp. alar. 1 unc. 1–7 lin.).

"This varies in size like *A. filipendulæ*, which it greatly resembles; but the border of the posterior wings is considerably more distinct than in that insect, and undulated internally: the sixth spot on the anterior wings (the one towards the anal angle) is generally small, with a coloured nervure passing through it; the under surface of the anterior wings with the disc entirely red, and the maculations not defined. Above, the anterior wings are blue-black, with six red spots, disposed as in *A. filipendulæ*, and the posterior wings red, with an undulated greenish-blue margin; the abdomen immaculate.

"Var. β. The anterior wings above of a pale yellowish-green, with six pale lemon-yellow spots; the posterior wings of the latter colour, with a bluish-green border. Like *A. filipendulæ* this varies considerably from the spots being more or less confluent, or obliterated.

"Caterpillar greenish, with a broad yellowish stripe on each side, and a row of black spots; the head black varied with white: the anterior legs brown, the following yellow, the rest black: it feeds on the wild liquorice (*Astragalus glycyphyllus*). The chrysalis is dusky-brown, with the abdomen greenish spotted with black.*

"I have captured this insect in the vicinity of London; first in a field near Coombe-wood on the 20th of June, 1810, and subsequently near Darenth-wood: of var. β, I have seen three specimens only, which were reared from larvæ taken in the latter habitat, where the wild liquorice abounds."

* These descriptions apply to the larva and pupæ of *hippocrepidis*, Hübn., not to the preparatory stages of *hippocrepidis*, Steph.

SOME THOUGHTS SUGGESTED BY MR. HARCOURT-BATH'S PAPER. (*Ante*, pp. 157–161).

By J. W. Tutt, F.E.S.

I have tried to understand the various papers by Mr. Harcourt-Bath that have been published in the 'Entomologist' during the past twelve months, and have signally failed. I do not wish to suggest this is Mr. Bath's fault, and I am inclined to think it is rather my misfortune than my fault. There must be, however, many entomologists in the same unfortunate position as myself, and if this communication only serves to draw from Mr. Bath an explanation more suitable to our meaner intellects it will have fulfilled its purpose.

Mr. Bath (*ante*, p. 158) makes the statement that "the geographical and vertical distribution of the Rhopalocera, in a very great degree, is so intimately connected with the distribution of their pabula that it is reasonable to suppose they have closely followed the various migrations of the flora upon which they are so dependent both antecedent to and after the termination of the glacial period." To illustrate this he goes on:—"As the genus *Erebia* is the most extensive and typical group among the alpine butterflies, it will serve to illustrate with a certain degree of accuracy the facts relating to the whole." Now the pabula of the larvæ of this genus is grass, and the species of *Erebia* are not very particular as to the species of grass. Grass, in great variety, extends from pole to pole. It is necessary therefore, so far as I understand Mr. Bath, to get a knowledge of the distribution of grass to obtain a knowledge of the distribution of the genus *Erebia*. Grass is found almost everywhere; the species of *Erebia* are often extremely localised. Their distribution is, of all genera, entirely independent of the general distribution of their food-plant, and most of the various species are often confined to a certain small portion of a valley in which the flora is practically identical over thousands of acres.

Having surveyed in the most cursory manner the distribution of the genus in Europe, Asia, and North America, he concludes that the species are segregated mainly in the Pyrenees, Alps of Europe, Caucasus, Thian Shan, Altai, and Amur. This is, of course, such a well-known fact that it appeared to be hardly worth mentioning. He also states that the species are very scarce south of the mountain chains, and that this furnishes us with an approximate estimate of the extreme distance south to which the alpine fauna was driven during the climax of the glacial period in the Palæarctic Region.

Mr. Bath (*ante*, p. 159) says that, "In preglacial times these

butterflies were probably found in company with their pabula throughout the whole of the northern portions of the Europasian area, their range extending to well within the Arctic Circle. Upon the advance of the ice-cap they retreated south until they reached the six great chains of mountains which I have already described. Many of the species were probably unable to surmount the barriers which they furnished, and consequently perished, whilst the majority perhaps forced their way through them by means of transverse passes and valleys, and survived in the sheltered and more hospitable areas which they would provide immediately to the south." Now this is a very pretty theory, but what about the geological and other facts assumed?

It occurs to me to ask Mr. Bath whether he thinks that any scientific entomologist believes that the genus *Erebia*, as such, existed in preglacial times? As I understand Mr. Bath's references, it would appear that his references to preglacial times are especially directed to those observations which geologists have published relating to the subtropical fauna and flora which are known to have existed in the extreme north in the Miocene period, and he assumes, so far as I understand his writing, that *Erebia* and the *Erebia* species lived in the North Polar Region at that time. If so, I would suggest that *Erebia* would be, under these conditions, a subtropical genus, and, being "driven southwards by the ice-cap," would, if it found subtropical quarters south of the six great mountain chains, by the species "finding their way through passes," to suit it, prefer remaining in such quarters to attempting a return which led it out of subtropical quarters, in order, apparently, to see how far it could get up mountains, or how far it could get back to polar conditions from the "remainder of Europe south of the mountain chains," which during the glacial period were "capable of affording a safe refuge to the alpine butterflies" during the dreadful time Mr. Bath says they experienced at the time of the glacial epoch.

One is constrained to ask, too, whether it would not have been more to the point if Mr. Bath had given us, on the authority of some capable geologist, the condition of the great mountain chains that extend from the Pyrenees to Kamtschatka during the periods comprised in, and that directly antecedent to, the glacial epoch; so that we might obtain some idea of the condition of the mountains the butterflies are said to have crossed? Sir John Lubbock tells us that in the European part of the range as much solid matter has been removed by denudation as now remains. Geikie tells us that at the time of the glacial epoch the whole of North Germany and the part of Europe in that latitude was covered with glacial loess. It is well known that the ice-flow from the Northern Alps set along Central Europe to the east, and one would like to know where those places were to be found "which we might fairly assume with a certain degree

of safety might be found to the north of the Alps, the Pyrenees, and the Carpathians," and "where a few species even survived."

Let us summarize the well-known facts:—(1) ice to the north of Germany; (2) mountains existing where the Alps are now; (3) glaciers flowing north into France, Germany, &c. And then we are asked to assume certain spots between the Alps and Baltic Sea where butterflies might survive, whilst those that did not survive pushed through transverse passes across the Alps—and such Alps and such passes! Then, as I understand it, there was a journey back after it was all over. This is picturesque, but—is it possible? For some years I have been almost as much interested in geology as entomology, but Mr. Bath's geology is beyond me.

Mr. Bath does not think "that the climatal conditions were so severe as supposed by Hoffmann." This is a matter for the geologists, and if they say it was—well, to say the least—as specialists, I should take their opinion before that of Mr. Bath. On the premises pointed out, Mr. Bath concludes that "the great majority of the alpine forms of butterflies found a sanctuary during the climax of the glacial period to the immediate south of the three great chains of mountains on either continent."

There is another phrase which I cannot understand. Mr. Bath says he thinks Hoffmann "is incorrect in imagining that the post-glacial alpine forms were not directly derived from the south." Now Mr. Bath has been at great pains to show in his paper that Hoffmann is wrong in supposing that the insects during the glacial epoch did not go into the warmer parts of Africa and Asia. This remark therefore means that Mr. Bath believes that this fauna was directly derived from the south, and "the south" as understood by Mr. Bath can only mean the country between the Pyrenees, Alps, &c., and the Mediterranean, so far as Europe is concerned, for he rules Africa out, not believing that even "a few went into Africa" and returned when the climate became warmer.

If our authorities on the geological conditions of Europe during the glacial epoch are correct, we have to deal with the following facts:—(1) Ice as far south as the Baltic Sea, giving off streams that flowed eastwards through Central Europe, and deposited the famous loess deposits of Germany. (2) Glaciers on the north face of the Alps, discharging also into the plains of Central Europe, the water-flow being east. As the whole of this central area was flooded during the Miocene period, one finds some difficulty in believing that any Lepidoptera existed north of the Alps, and hence it follows that Hoffmann's suggestion is probably the correct one. The distribution of the Lepidoptera previous to the glacial epoch is the merest guesswork.

That any of our present species of butterflies existed before the glacial epoch is very problematical—that the genus *Erebia*

existed as such, I think no one who is both an entomologist and geologist would admit. It is probable that there was at the period of the land-connection between North Europe, Asia, and America some ancestral and widely distributed form which was subjected to vicissitudes of environment through the vast periods of time represented by the glacial epoch, and which, being of a plastic form, split up under the stress of environmental conditions into what we know as the various species of *Erebia*. And if we turn to facts as apart from mere speculation, *i.e.* to the facts offered by the study of the animals themselves, one is driven irresistibly to the conclusion that the genus *Erebia* as it at present exists is one of the most modern of all those inhabiting the Palæarctic and Nearctic Areas. Its species even now are not at all clearly defined. They are even now in some instances evidently in a state of evolution. Our best students of the butterflies of these regions own the fact, and my own studies of the alpine fauna are leading me irresistibly to the conclusion that a very large percentage of the alpine species by no means exhibit archaic types, but, on the other hand, exhibit the most recently modified of the species belonging to persistent genera which are spread over a vast area of land as measured by latitude and longitude, and whose larvæ feed on plants of very general distribution, not only as to latitude and longitude, but also as to altitude.

I am quite aware that destructive criticism is easy, and that it is more difficult to propound a satisfactory explanation. These critical notes have already run to considerable length, but I am quite open on the geological evidence to show that previous to the glacial epoch the distribution of plants (and therefore probably of insects) was a much simpler matter than at present. The climatic conditions, as shown by the Cretaceous and later forests, were comparatively uniform over the earth's surface, the plants inhabiting them were similar, the species (both of plants and insects) were few; that these archaic forms were the ancestors of our present fauna is very certain, but that they had developed any of the existing forms at any time preceding the glacial epoch is very improbable. Perhaps, if it appears necessary, our Editor will allow me to recur to the matter later.

NOTE ON SOME ORTHOPTERA FROM THE PERSIAN GULF.

By Malcolm Burr, F.E.S.

Mr. R. W. Lloyd has very kindly placed at my disposal a few Orthoptera, collected by Mr. J. H. Hiles at Bussorah. On the whole the species are what one would expect to find in that part of the world, though very little collecting, if any, has been done

there. They are chiefly European species, but there is one cockroach that was previously known from Bombay; but with many cockroaches and some earwigs locality is of no account, for they spread with trade all over the world to such an extent that it is sometimes doubtful whence they originally came. It is interesting to find the Egyptian *Tryxalis pharaonis*, Klug, in the Persian Gulf; it is not found in Europe.

The collection includes seventeen specimens and ten species, of which there are two Blattodea, two Mantodea, four Acridiodea, one of the Locustodea, and one of the Gryllodea. There were also a few aquatic Rhynchota, which Mr. G. W. Kirkaldy tells me are *Ranatra vicina*, Sign., and *Belostoma niloticum*, Stål, which are species which one would expect from the neighbourhood. The following is an account of the Orthoptera:—

Heterogamia ægyptiaca, Linn. One male. Occurs also in Southern Europe from Spain to Greece, in the north of Africa, Asia Minor, Syria, Rhodes, and the Amoor district (Brunner).

Periplaneta monochroma, Walk. One male. Apparently allied to *P. pallipalpis*, Serv. Also from Bombay (Brit. Mus. Coll.).

Mantis religiosa, Linn. One mutilated female. Occurs also in Southern and Central Europe, in Asia from Hindustan to Java, and in Africa to Zanzibar (Brunner); also in the Canary Islands, China, Cyprus, Corea, Afghanistan, Silhet, Behar, and the East Indies (Brit. Mus. Coll.).

Empusa pennicornis, Pall. One specimen. Also from South Russia (Burm. Kittary), Sarepta on the Volga (Eversm.), and Turkey (Burm.).

Tryxalis pharaonis, Klug. One female. Also from Egypt (Klug).

Epacromia tamulus (?), Fabr. = *tricoloripes*, Burm. One female. Widely distributed over Eastern Asia and Australia. It is with a little hesitation that I refer it to this species, but the specimen seems to be hardly different from individuals from Mindoro in my collection.

Opomala cylindrica, Marschall. Two females. Also from Minorca (Bol.), Sicily, Greece (Brunner), Beyrout (Coll. mea).

Acridium ægyptium, Linn. Two females, showing great difference in size. Length of body, 46 mm. and 66 mm.; length of elytra, 51 mm. and 67·5 mm.; length of post-femora, 26 mm. and 33 mm.; expanse of elytra, 110 mm. and 141 mm. This species is the largest of the European Acridiodea; it is common in Southern Europe, but does not commit any serious damage in spite of its size. It occurs in the Kirghis steppes, but Brunner remarks, "Further east into Asia it is as little known to me as it is in Central or South Africa." It is occasionally imported into this country in vegetables.

Decticus albifrons, Fabr. Two females. This fine species is common in the Mediterranean region and in Asia Minor. It extends as far as the Ural Mountains (Eversm.). It has once been taken in England, at Ramsgate, but probably escaped from a passing vessel.

Gryllotalpa gryllotalpa, Linn. One male and four females. Common in Europe, west of Asia and North Africa. The allied *G. unispinosa*, Sauss., is found in Turkestan, and *G. africana*, P.-B., is found

throughout Africa, except the north coast, Madagascar, Southern Asia, China, Java, Sumatra, and Borneo (Sauss.). I have ventured to restore Linnæus's specific name. If Latreille adopts the specific name for the generic, it is no reason that the law of priority should be infringed, and Linnæus's name must stand. It is unfortunate that the two names should thus be the same, but the only way in which it can be avoided is to change the generic name; but it has been in such general use for so many years that the confusion that would follow would be worse than the evil of having the generic and specific name alike, which at least has the advantage of fixing the type of the genus.

Bellagio, East Grinstead, May 26th, 1897.

AN ESSAY ON THE CLASSIFICATION OF INSECTS.*

By John B. Smith, Sc.D.

Of late years the phylogeny of insects has attracted considerable attention from students, and much light has been thrown upon the subject by the researches made. One of the most notable facts has been the breaking away from the old Linnean orders, and the substitution of a number of more compact assemblages for some of the almost indefinable aggregations found in the old classification. New characters have been sought, not only in structures visible externally, but even in internal anatomical peculiarities. The subject is a very interesting one, which the teacher is of necessity compelled to study more or less, and which I was led to examine more particularly when the question recently came up as to the adoption of some system in a general work on 'Economic Entomology,' which has since been published. The conclusions reached by myself, while in general they agree with the latest published results, have been arrived at by a somewhat different method, and my ideas concerning the development of the orders are somewhat unlike those heretofore accepted. I have tried to adhere logically to a scheme of easy development, and have made use of some characters not heretofore particularly noted. Leaving aside for the present all questions as to the origin of the class "Insecta," and as to its ancestors, I start from a developed hexapod—an archetypal Thysanuran with six, jointed legs; without wings; with or without abdominal appendages other than functional legs; with no eyes or with ocelli only; with a head not greatly differing in size or form from the body segments; with the thoracic segments equally developed and not greatly differing except in appendages from those of the abdomen. This creature lived in moist places, perhaps partially in

* 'Science,' N. S., vol. v. pp. 671–677 (April 30th, 1897).

the water, and had the tracheal system feebly or not at all developed; absorbing oxygen chiefly through the skin and tending, perhaps, as much in the direction of an aquatic as a terrestrial life. It had no distinct metamorphosis, was oviparous, bisexed, changing little in appearance from the time it emerged from the egg until it was adult and capable of reproduction. The mouth structures were generalized, feebly developed; but with at least three, and possibly four, pairs of composite structures corresponding to mandibles, maxillæ and labium of our existing insects. The possible fourth pair may have been an endo-labium and, perhaps, the labrum with its attached epipharynx may have required a fifth pair of structures. Most essential of all was an inherent power of variation and adaptation, and probably, as with some of our present Thysanurans, reproduction was rapid and enormous numbers existed. The first important differentiation occurred in the mouth structure long before wings became developed, tending on the one hand to a perfection of all or most of the parts, or to a mandibulate type; on the other to a loss of certain of the structures, accompanied by a different development of the others, forming a haustellate type. In this latter branch the mandibles were never developed, the maxillary structures became elongated, separated into their parallel parts, and the labium became obsolete as a functional organ. Just how many intervening orders existed between Thysanura emandibulata and the best development of the haustellate structures it is impossible to say; but the only one in existence at the present time is Thysanoptera, also called Physopoda, otherwise Thrips.

This order I consider a distinct one on the same branch from which arose the Hemiptera, but forming merely a short spur and retaining characters which were soon lost in the main and more vigorous branch. It is a survival which has lost the power of further development, and can do no more than merely maintain itself. The main branch formed the Hemiptera, or, as I prefer to call them, the Rhyngota of to-day; the mandibulate parts being completely lost, the labium losing all external appendages, and the maxillæ forming the jointed beak with its enclosed lancets.

The Thysanoptera and Rhyngota of all the existing orders are the only ones that do not have functional mandibles in some stage of their development. They are haustellate from their birth, and the character of the mouth parts never changes. In all the other orders, either larvæ or adults, or both, are mandibulate. I am aware that there are seeming exceptions in several orders, notably the Diptera; but it will hardly be disputed that this order is of a mandibulate stock, and many larvæ have the parts well developed.

It results from the views just stated that the Thysanoptera and Rhyngota are a division equal in value to all the other, or

mandibulate, orders combined. They have their origin from the common stock, but were always haustellate or emandibulate in all stages, forming the first and lower of my main divisions. With the development of this branch, after its distinctive feature became established, I have nothing to do at present. It seemed adapted for variation in special lines only, and, as the method of feeding was practically fixed from the beginning, there is a remarkable similarity in mouth parts throughout.

The *mandibulata* possessed much greater powers of variation, and a mouth structure in which all the parts were developed and capable of modification, containing possibilities of much greater range in obtaining food. They lived therefore under all sorts of conditions, in all sorts of media, and all kinds of modification were produced; some of them short-lived, adapted only to surroundings then existing; others with greater possibilities, that exist to the present time.

The first mandibulate insect had the thoracic segments similarly developed, all of about the same size, and each of them free; but the advent of wings gave opportunity for radical divisions. I have no desire to go into details here more than necessary to explain my views of classification, hence will not pretend to account for the origin or development of wings. They did appear, however, and independently at several different points. In all cases the wings were net-veined or neuropterous in type, a peculiarity which is explicable if the venation be considered of a tracheal origin. With the appearance of wings many divergences in habit were made possible, and new types began to appear. Three main lines branched almost simultaneously from the common stock, each of them fairly well marked from the beginning, retaining its peculiarities and even intensifying them in all future subdivisions to the present time. In the first of these the prothorax, bearing no wings, became separated from the other rings and movable, or in a sense dominant. In both the others it tended to a reduction in size or to become agglutinated with or united to the others. In a general way it may be said that the series in which the prothorax is free is lower in the scale of development, as retaining a more primitive type. The orders belonging to this subdivision or branch are the Dermoptera, Coleoptera, Plecoptera, Platyptera, and Orthoptera.

[The orders placed in the first division are then discussed in detail, and remarks made on phylogeny.]

The second branch from the Thysanuran stem started with all the thoracic segments nearly equally developed. While the prothorax was of good size and in the lowest forms quite free, yet the tendency was from the very start to unite it at its base to the other thoracic segments. In this series it is always fairly well developed, sometimes even very long; but it is always

closely joined to the mesothorax at the base, and is not movable, while the tendency is for the head to become free from it, and at all events not to be inserted into the thoracic segment. While we do not have anywhere in this series a distinct neck, yet on the other hand there is nowhere a retraction of the head into the prothorax. In this series both pairs of wings are similarly developed, both as to size and as to general character, while the secondaries, though frequently covered by the primaries, are never folded beneath them in any way. The primaries are always functional.

The lowest in this series, and almost the simplest in general structure, are the Isoptera, where all the thoracic segments are well developed, and the prothorax is scarcely dominant, though larger and almost free from the others. The wings are very much alike, the secondaries only a little larger than the primaries, and both are laid flat upon the abdomen. The mouth structures are almost identical with those of the earwigs and some of the Orthoptera. I believe the members of this order are amongst the most primitive of all the terrestrial winged insects now existing, and among the most ancient, though remarkably specialized in certain directions at the present time. Though at first glance it would seem as if these insects should belong to the series in which the prothorax is free, yet the character of the wing structure forbids this association, and makes the Isoptera a natural stem from which were derived the Mallophaga, Corrodentia, and Neuroptera.

[The phylogeny of the orders included in the second division is then considered.]

The third series, in which the prothorax becomes much reduced in size and firmly articulated to the mesothorax, has the body parts as a whole much more closely jointed and globular. The tendency is to bring the origin of the legs close together, and to the loss of the sternum as a distinct part or sclerite between the coxæ. The mesothorax becomes dominant and best developed, bearing also the chief organs of flight. As a whole, subject to many exceptions, the tendency is to the development of the primaries, which are never reduced to mere wing-covers and never lose function. The tendency seems to be rather to a decrease in the size of the secondaries, as in Hymenoptera, and to their total loss, as in the Diptera. There is, however, a great deal of variation in this respect, and the most that can be justly said is that in this series the secondaries never become the only, or primary, organs of flight. Another point of very great importance is that here the head is nearly always more or less free or well separated, tending to the formation of a distinct neck; while there is never any insertion of the head into the prothorax. This fact will become very striking when the orders that are placed here are compared with those in the

other section, and this difference in the articulation of the head has never been, in my opinion, sufficiently emphasized in our classification of the orders. It is closely correlated with the decrease, in size, of the prothorax.

In mouth structure the tendency is all in the direction of galear development in the maxilla, while the lacinia becomes constantly less important. In the Diptera, in which this series finds its highest development, the galea predominate over all other mouth structures. In the Hymenoptera the galea is always most highly developed, and particularly so in the bees, the most completely differentiated of all in the order. In the Lepidoptera the galea alone is developed into a functional organ, and in those net-veined orders in which the mouth parts are not rudimentary merely the galea is at least as well developed as and never subordinated to the lacinia. The orders which I placed in this series are Odonata, Ephemerida, Trichoptera, Mecoptera, Hymenoptera, Siphonoptera, and Diptera.

[Here follow remarks on the phylogeny of the orders in the third division.]

I am quite aware that objections may be urged to this scheme, and that it is imperfect in some respects, but so also are all the others that have been proposed; and I believe, as I look at the matter, that my plan answers more of the objections than any other that I have seen. Nothing known to me contradicts it more vitally than any other that has been proposed.

I have accorded very little place to the character of the metamorphosis, because there is no hard and fast line between complete and incomplete; but the closer comparative study of early stages will unquestionably help out our future classification. I have not made use of any one character as the basis of my scheme of division, because I do not think nature works in that way; and, finally, I have used adult stages only, because I see in the adult ready to reproduce, the species. It is the culmination of individual growth, and until it is ready to reproduce it is incomplete, subject to change, and not an expression of the point to which its development has attained.

NEW SPECIES OF SOUTH AMERICAN EUMOLPIDÆ.

By Martin Jacoby, F.E.S.

(Continued from p. 170.)

Chalcophana elongata, n. sp.

Elongate, narrowed posteriorly, black, above fulvous with metallic green gloss; head and thorax sparingly punctured, stained with fuscous; elytra strongly and closely semi-regularly punctured, the sides very acutely bi-costate, apical angles concave-emarginate. Length 4 lines.

Head sparingly, irregularly, but distinctly punctured, fulvous, the vertex with a more or less distinct greenish black spot; clypeus subquadrate, finely punctured; antennæ scarcely extending to the middle of the elytra, fuscous or black, the lower four joints fulvous, the third and the following four joints elongate, equal, the terminal ones shorter; thorax nearly twice as broad as long, the sides nearly straight, oblique, the angles tuberculiform, the disc with a more or less distinct lateral fovea, very sparingly and irregularly impressed with larger and smaller punctures, dark fulvous, the sides marked with piceous, ill-defined; scutellum fulvous; elytra reddish fulvous with metallic pale green gloss, very elongate, the apex of each concave-emarginate, the surface closely and very strongly punctured, the punctures near the suture more or less geminate and separated by raised longitudinal interspaces which assume the shape of strongly raised costæ at the sides, of which two below the shoulders are very highly raised and continued to the apex, the shoulders themselves are likewise strongly raised and prominent, and have another short costa below near the lateral margin; breast and abdomen black; legs fulvous; prosternum very deeply bilobed.

Hab.—Bolivia.

This is one of the most distinct species of the genus, which may be best compared with *C. quadricostata*, Jac. (Biolog. Cent. Amer.), on account of the emarginate elytral apex; the present insect is, however, very elongate, and has the entire under side black, while the legs and tarsi are fulvous. The two specimens contained in my collection are evidently females, and the other sex is probably devoid of the elytral costæ.

Chalcophana viridi-basalis, n. sp.

Elongate, pale fulvous; the antennæ, tibiæ, and tarsi black; thorax sparingly punctured; elytra strongly and closely punctate-striate, pale fulvous, gradually shading into metallic green at the base. Length 3–4 lines.

♂. Head rather strongly and closely punctured, dark fulvous; clypeus similarly sculptured; labrum flavous; antennæ extending beyond the middle of the elytra, black, robust, the third joint one half longer than the second one, but much shorter than the fourth joint; thorax twice as broad as long, the sides rounded, the angles tuberculate, the surface with larger and smaller punctures, sparingly and irregularly distributed; elytra strongly punctured near the base, the punctures gradually diminishing in size and arranged in closely approached rows, the basal portion and the suture metallic green, the rest of the surface pale fulvous, both colours gradually blending before the middle; under side and the femora pale fulvous; the tibiæ and tarsi nearly black.

♀. Larger; the elytra with two or three short costæ at the sides below the shoulders.

Hab.—Bolivia.

In this species, of which I possess six specimens, the metallic green colour of the elytra is confined to the base only, although

not well separated from the pale fulvous portion. I am not acquainted with any similarly coloured *Chalcophana*, which on that account and the dark antennæ and tibiæ will not be difficult to distinguish.

Chalcophana punctatissima, n. sp.

Obscure fulvous with metallic gloss; antennæ (the basal three joints excepted), the tibiæ, and tarsi black; thorax very sparingly punctured; elytra metallic green, extremely closely punctured, the lateral and apical margins narrowly fulvous. Length, 3½ lines.

♂. Head rather closely punctured, fulvous, with a purplish gloss, the middle with a short but deep groove, frontal tubercles strongly raised; clypeus nearly impunctate; antennæ black, the lower three or four joints fulvous; thorax scarcely twice as broad as long, the sides rather strongly rounded, the angles tuberculiform, the surface finely and very sparingly punctured, dark rufous with a strong purplish or greenish gloss; scutellum fulvous; elytra metallic green with a very slight depression below the base, the apical angle of each produced into a small tooth, the surface closely and finely punctured, especially so near the apex, the punctures near the suture below the middle arranged in more or less distinct double rows which are interrupted by some smooth longitudinal spaces, the extreme lateral and apical margins as well as the suture posteriorly rufous; under side and legs rufous; the greater portion of the tibiæ and the tarsi bluish black.

Hab.—Ecuador.

The very close and fine elytral punctuation distinguishes this species.

Chalcophana abdominalis, n. sp.

♂. Fulvous; the antennæ (the basal two joints excepted), the apex of the tibiæ, the tarsi, and the abdomen black; thorax sparingly punctured; elytra metallic green, finely punctured in single rows, the base with a depression. ♀. Elytra olivaceous green, very finely punctured, the sides with two short costæ. Length 3½–4 lines.

Head with a few punctures and the usual central depression, fulvous, the apical joint of the palpi piceous; antennæ extending beyond the middle of the elytra, bluish black, the basal two joints and part of the third fulvous; thorax scarcely twice as broad as long, the sides moderately rounded, the angles but slightly prominent, the surface with a few fine scattered punctures; scutellum nearly black; elytra metallic green, with a rather distinct lateral depression below the base, finely punctured in single rather closely approached rows, which, below the middle, are here and there arranged in pairs; the breast and the femora fulvous; the lower two-thirds of the tibiæ, the tarsi, and the abdomen black.

Hab.—Bolivia.

In the colour of the abdomen this species agrees with *C. peruana*, Har., and *C. palumbina*, Erichs.; from the former it is distinguished by having only the basal two joints of the antennæ

fulvous and by the colour of the tibiæ and the distinct elytral depression. Von Harold has apparently described the female only, and says nothing about the sexes in any of his descriptions, which is one of the most important points in this genus. The female of the present species is larger, but agrees in all essential points, except in the colour of the elytra, which are of a dull olivaceous tint (there is only one specimen of this sex before me, I am therefore unable to say whether this colour is constant), and are more finely punctured than in the male; an indistinct costa runs from the shoulder to about the middle of each elytron, but another strongly raised costa is placed at the side below the shoulder and is again followed by another more indistinct one near the lateral margin. The apex of the elytra is not produced in either sex.

(To be continued.)

NOTES AND OBSERVATIONS.

Temperature Experiments on Lepidoptera. — Among the specimens exhibited by Dr. Standfuss in the insect gallery at the Natural History Museum, South Kensington, are some remarkable aberrations of *Vanessa polychloros*, *V. urticæ*, *V. cardui*, *V. atalanta*, *V. io*, and *V. antiopa*. One especially beautiful example of *V. antiopa* has all the wings shot with blue; another specimen of the same species has abnormally large blue spots; in others there is considerable darkening of the yellow borders, more particularly on the fore wings; others again show modification in the width of border, in some this is exceptionally wide, and more or less completely obscures the ordinary blue spots; these last would appear to be referable to var. *hygiæa* (a figure of a modification of this form will be found Entom. xxii. pl. viii. fig. 4). In the aberration of *V. atalanta*, the chief features are absence of costal white spot and an increase in the size of two of the spots of outer marginal series above red band; there is also modification in the width and shape of the red band. Of *V. io* there are, among other curious forms, some interesting examples of the "blind-eyed" aberration *dyophthalmica*. In addition to the many highly instructive results of the artificial temperature treatment exhibited by Dr. Standfuss, there is a selection of results obtained by Mr. Merrifield, who, as is well known, has devoted much time to this line of scientific investigation. If anyone is still sceptical as to the effect of temperature in the coloration of Lepidoptera he should make a point of studying the series of *V. urticæ* and *V. levana*. Of the first-named species there are six examples which emerged from pupæ that had been iced and cooled, and six from pupæ that had been subjected to increased temperature. Five of the former show a general darkening of the black spots and a blackish suffusion of the secondaries, whilst the sixth has the ground colour deeper than usual and the yellow spots are absent. Of the six forced specimens, four have the three central black spots more or less effaced, and in the other two the outer margins are paler. Winter

pupæ of *V. levana* subjected to the forcing process produced specimens like some of those resulting from summer pupæ which had been first cooled and subsequently forced. On the other hand, iced and cooled summer pupæ yielded forms which although larger in size are almost identical in coloration with those emerging under normal conditions from winter pupæ. We understand that this collection, which is still at the Museum, will only remain there for a short time longer.

Melanism and Climatic Conditions.—Referring to the paper on this subject by Mr. G. W. Smith (*ante*, p. 127), a contemporary thinks it is superficial and illogical, and adds:—"The author writes from the College, Winchester, and the paper might readily be supposed to emanate from a schoolboy who did not understand his subject. But why such a prominent place in 'The Entomologist'?" The author of the paper in question is not personally known to us, but if he be a schoolboy, as suggested by the captious critic from whose note we have quoted, his communication is at least free from disparaging remarks concerning those who hold views opposed to his own, and this is more than can always be said of the published writings of a schoolmaster. Further, we are of opinion that the paper is not illogical, and we have reason to believe that the author is fully acquainted with his subject. The "prominent place" query may be passed over as inconsequent.

Hybrid and Mongrel Lepidoptera.—On a previous occasion I suggested that those who were skilled in rearing Lepidoptera from the egg should turn their attention to experiments in hybrid breeding, which, so far, has not been attempted in any large way. Some idea of the possible results in this direction is to be found in the specimens obtained by Dr. Standfuss exhibited at the Royal Society and at the Natural History Museum, South Kensington. Among these there were hybrids developed from three different species, i.e. *Saturnia pavonia* (*carpini*), *S. pyri*, and *S. spini*. The labels bearing information were not easy to read, owing to the fact that they were obscured by the frame of the table-case in which the species were placed, but from what I could make out it would seem that hybrid males from a crossing of *S. pyri* and *S. pavonia* paired with female *S. spini*, producing most interesting offspring. In another series there were the mongrel progeny of crossings between (1) *Callimorpha dominula* ♂ and var. *persona* ♀, (2) *persona* ♂ and *dominula* ♀. For the information of those who may not be acquainted with the *persona* form of *dominula*, it may be well to state that it has much smaller spots on the fore wings, and the hind wings are black with an irregular yellow patch at the base and one or two small yellow spots beyond. In these mongrel specimens the characters of both parents were exhibited, but the tendency was stronger in the direction of *dominula*; the hind wings in both series were of the typical colour, but a trifle paler in series 2. The results of pairings between *Spilosoma mendica* and its var. *rustica* were somewhat similar to those obtained by Mr. Adkin a few years ago.—R. S.

Pieris brassicæ attracted by Artificial Flowers.—Whilst walking up Regent Street yesterday I noticed a *P. brassicæ* flying round and

round the head of a lady who was wearing a hat trimmed with a large bunch of artificial lilies of the valley, it evidently mistaking them for the real flowers. It continued to follow her for some distance, and would undoubtedly have settled on the flowers had she not been walking at a quick rate, several times attempting to do so. It created a good deal of interest, several people stopping to notice it.—C. E. Bedford; Acton, W., May 28th.

Diloba cæruleocephala Feeding on Prunus lauro-cerasus.—This moth, which is generally common in the neighbourhood of Haywards Heath, has this season done very little damage to the sloe where the cherry laurel grew. I have no notes of the larva of *D. cæruleocephala* eating this shrub before.—H. W. Bell-Marley; June 17th, 1897.

[There are several records of the larva of *Diloba cæruleocephala* having been found feeding on *Prunus lauro-cerasus* in the 'Entomologist' for 1890.—Ed.]

The Lepidoptera of Middlesex.—In the 'Entomologist' (xxviii. p. 304) is a short note of the additions made to the list of Middlesex Lepidoptera in vol. i. of 'Harrow Butterflies and Moths,' published by the Harrow School Scientific Society. The second volume (1897) (J. L. Bonhote and N. C. Rothschild) completes the catalogue, and several species hitherto unrecorded, either by Mr. Cockerell (Entom. xxiv.–xxv.) or by me (Entom. xxvii.–xxviii.), are to be found in its pages. These are *Eupisteria obliterata* (1895), *Numeria pulveraria* (Bond), *Abraxas sylvata*, *Emmelesia unifasciata*, and *Eupithecia linariata*, *E. succenturiata*, *E. dodoneata* (Bond), *E. pulchellata*, *Hypsipetes ruberata* (Bond), *H. trifasciata*, *Cidaria immanata*, *C. prunata*, *Aglossa cuprealis* (Bond), *Scoparia cembræ*, *S. cratægella*, *Ebulea crocealis*, *Spilodes verticalis*, *Aciptilia galactodactyla* (Bond). The majority of these observations, as will be seen, were made by the late Mr. Bond before Kingsbury became suburbanized. But the diligence of local collectors elsewhere has restored to the list many Heterocera which might have been expected to be extinct so far as county Middlesex is concerned, Mr. Rhoades-Smith being apparently extremely successful. From the supplement to vol. i. it also appears that *Macroglossa bombyliformis* was taken by Mr. Bond at Kingsbury, while the record of *Trigonophora flammea* under my name in Mr. Cockerell's list is properly deleted, as it was included in the list sent by me to that gentleman in error (Entom. xxiv. 280).—H. Rowland-Brown; Oxhey Grove, Harrow Weald, May 30th, 1897.

Committee for Protection of Insects in Danger of Extermination.—At a meeting of the Committee held on June 2nd, it was resolved that the following species of Lepidoptera, being local species in danger of extermination, be more particularly recommended for protection in accordance with the final paragraph of the Memorandum of Association:—

Papilio machaon, L.
Leucophasia sinapis, L.
Pieris cratægi, L.
Melitæa athalia, Esp.
M. cinxia, L.
Nola albulalis, Hüb.
Eulepia cribrum, L.
Porthesia chrysorrhœa, L.
Clisiocampa castrensis, L.
Drepana sicula, Schiff.

Apatura iris, L.	*Diphthera orion*, Esp.
Limenitis sibylla, L.	*Acosmetia caliginosa*, Hüb.
Thecla pruni, L.	*Dianthœcia irregularis*, Hufn.
Polyommatus arion, L.	*Plusia orichalcea*, Fab.
Cyclopides paniscus, Fab.	*Epione vespertaria*, L.
Hesperia actæon, Esp.	*Fidonia conspicuata*, Schiff.
Trochilium scoliæforme, Hüb.	*Scoria dealbata*, L.
Zygæna meliloti, Esp.	*Cidaria reticulata*, Fab.
Z. exulans, Hoch.	*Lithostege griseata*, Schiff.
Nola strigula, Schiff.	*Agrotera nemoralis*, Scop.
N. centonalis, Hüb.	*Pterophorus rhododactylus*, Schiff.

Further resolved, that a copy of this list be forwarded to every Society co-operating with this Committee, with an explanation (where necessary) that the Committee does not desire to hamper any local Society in any more stringent action proposed to be taken by them for the protection of local species. Also resolved, that each such Society be invited to delegate one of its members, who shall be received as a member of this Committee.—CHAS. G. BARRETT, *Hon. Sec.*; 39, Linden Grove, Nunhead, S.E.

CORRECTION.—Page 160, line 3, *for* north of Europe *read* north of Africa.

CAPTURES AND FIELD REPORTS.

WHIT MONDAY AT OXSHOTT.—The first objects to attract attention almost directly after leaving the station were the young pine trees. Almost every one of these showed signs of being attacked by *Retinia* larvæ. The leading shoots of a number were tenanted by *R. pinicolana*, and the side shoots of many others were badly infested by *R. buoliana*; the former mostly in pupæ, and the latter as larvæ, but about to pupate. Further on, among the birches, *Phlœodes demarniana* was obtained, altogether five specimens; three of these were disturbed from the foliage; one was found at rest on a birch-trunk, and another on a sprig of heath under a birch tree. *Eupœcilia nana* was common, but most of the specimens netted were worn. The only buckthorn bush I have observed in the locality was thickly populated by larvæ of *Gonopteryx rhamni* in all sorts of sizes, from recently hatched up to half grown; there were also a good many eggs on the under sides of some of the leaves. Mr. Forrester, who was with me, took some of the larvæ, and thus gave those that were left a better chance of feeding up. If the whole number had been allowed to remain the smaller ones must have fared badly, as the bush was certainly not large enough to nourish to maturity all the larvæ that we saw upon it. Soon after leaving the buckthorn I espied a specimen of *Drepana lacertinaria* at rest, and as this proved to be a female, I secured her in the hope that she might deposit some ova, but she failed to do so. The next insects to interest us were *Aspilates strigillaria*, which Mr. Forrester attended to, whilst I was engaged with *Phoxopteryx uncana*; the examples of the last-named species appear to me to be brighter than those I find in other localities. On the way to the larger pine trees a few larvæ of *Asphalia flavicornis* and some commoner things were observed, and a pupa of *Phycis betulæ* was taken.

The last-named species seems to be less common than it was some six or seven years ago at Oxshott. Being well among the pines, *Bupalus piniaria* was seen in numbers, with an occasional *Eupithecia indigata*. I made a long search for larvæ or pupæ of *Tortrix piceana*, but could not find the species in any stage, though judging from the number of twigs that had been cut from the smaller trees it appeared that some one had had better luck than myself. The extermination of this species in the Oxshott district by the avaricious collector is hardly probable, otherwise I might regret that I did not keep to myself what I know of it in its earlier stages. Several other insects than those referred to were seen, but the only ones worth mentioning were a specimen of *Bombyx rubi*; some *Retinia pinivorana* which were seen flying round the pines just before dusk; and three or four specimens of *Endopisa nigricana* that were netted in one sweep of the net. This last capture was rather curious; I noticed a Tortrix fly to and settle on the end of a branch of birch; the net was quickly after it, and when I came to examine what kind of beastie I had captured, I found several moths trying to regain their liberty. Four of these were boxed, and they all turned out to be *E. nigricana*, three males and one female. No doubt those that escaped were males of the same species, and it is most probable that all were attracted by the female. — RICHARD SOUTH; 100, Ritherdon Road, Upper Tooting, S.W.

SESIA CULICIFORMIS IN CHESHIRE.—On a visit of a few days last week to Delamere Forest, I had the pleasure of taking two fine specimens of *S. culiciformis*, on birch-leaves, basking in the sunshine. As I understand this insect has not before been taken in the forest, nor indeed in the county of Chester.—CHAS. F. THORNEWILL.

AMPHIDASYS BETULARIA VAR. DOUBLEDAYARIA IN THE LONDON DISTRICT.—On May 23rd I picked up a specimen of *A. betularia* var. *doubledayaria* in this neighbourhood. It is the first I have ever met with in the London district, although I have bred the type in large numbers.—A. W. MERA; 79, Capel Road, Forest Gate, May 24th, 1897.

LARVÆ OF BOMBYX NEUSTRIA have been and are still quite abundant in this locality this season. On May 17th I noticed as many as nine separate colonies in a distance of forty yards on blackthorn bushes, and last week as many feeding on sallow and osier. In other places, where the broods have separated, larvæ nearly full grown may often be seen. With regard to the present season, Lepidoptera here are fully two weeks later in their emergence compared with last year.—T. B. JEFFERYS; Laugharne, Carmarthenshire, June 14th, 1897.

LEUCOPHASIA SINAPIS, L., IN CO. WATERFORD, &c.—I am happy to say that this generally local and scarce butterfly has occurred not uncommonly at Curraghmore, near Portlaw, during the present season. I visited this locality on three occasions, and met with the butterfly on each; it was especially abundant on my last visit there, the 5th inst., and I took over a dozen specimens in fine condition, principally in a bit of marshy ground bordered by trees. I also had the pleasure of taking a single specimen of the "wood white," in an open space in a fir-wood situated on the slope of a low hill facing a boggy tract of land near Mileport in the Co. Kilkenny. I believe the Co. Kilkenny has not hitherto been recorded as a habitat for this local butterfly.—L. H. BONAPARTE-WYSE; Waterford, June 21st, 1897.

SOCIETIES.

Entomological Society of London.—*June 2nd.*—Mr. R. Trimen, F.R.S., President, in the chair. The President referred to the great loss which the Society had sustained by the death of Dr. Fritz Müller, one of its honorary Fellows, and to his distinguished services in the cause of entomological science, and especially in forwarding the theory of the origin of species. Dr. Chapman exhibited the larva of *Eriocephala allionella*. Mr. Jacoby exhibited a fine example of the large Hepialid, *Leto venus*, from Plettenberg Bay, South Africa. The President said that the insect afforded an interesting case of localised distribution, being confined to an area of about fifty by fourteen miles, whereas the larva fed in the wood of *Virgilia capensis*, a common and widely-distributed leguminous tree. The insect was very conspicuous, and could not have been overlooked in other localities. Mr. Burr showed a pair of gynandromorphous earwigs, *Chelisoches morio*, Fabr., from Java, with ordinary males and females for comparison. In both specimens the right branch of the forceps was of the male, and the left branch of the female form. De Bormans had recorded a similar case in *Labidura pugnax*, Kirb., from Burmah, in which also the right branch was male and the left female. In the National Collection there was a *Chelisoches morio*, in which the left branch was male and the right female. According to Brunner this phenomenon was not uncommon in the Forficularidæ, but Mr. Burr had heard of no other cases. The Hon. Walter Rothschild exhibited a series of specimens of *Eudæmonia brachyura*, Drury, and *E. argiphontes*, Kirby, to show the differences between these two West African Saturniid moths. The distinctness of the latter species had been doubted, as until recently it was only known by the unique examples in the Dublin Museum, and the three published figures of these were materially different from each other. A comparison of the series exhibited showed the two species to be abundantly distinct. Mr. Kirkaldy exhibited fifty specimens of *Notonecta glauca*, Linn., to show the extreme range in size and colour of this widely-distributed species, to which the Palæarctic *N. lutea*, Müll., was extremely closely allied, if not conspecific with it. The discussion on mimicry and homœochromatism in butterflies was then resumed by Dr. Dixey, who replied to the comments of Prof. Poulton and Mr. Blandford on his paper. He did not regard the phenomenon of reciprocal convergence as necessarily a demonstrable feature in Müllerian mimicry; it was merely potential. With respect to mimetic Pieridæ, he did not consider that they were invariably protected, but that, in certain cases, they were shown to be so by the indications of convergence exhibited by the models. Mr. Elwes thought, from his personal experience as a collector, that there was too much assumption about both the Batesian and Müllerian theories. In many supposed cases he doubted whether the so-called models were protected by taste or smell. He had previously referred to the extraordinary superficial resemblance between two Pieridæ found in the high Andes of Bolivia, and two others found at similar elevations in Ladak, and was inclined

to think that similar conditions of environment produced similar effects. Mr. J. J. Walker, Sir George Hampson, and Col. Yerbury gave evidence, from personal experience in the Tropics, as to the extreme rarity of butterfly destruction by birds. The President admitted its rarity in Africa; but stated that he had seen birds, especially the Drongo shrike, chasing butterflies. Mr. Blandford called attention to a recent paper by M. Piepers, who, as the result of twenty-eight years' observation in the Malay region, had seen four instances only of butterflies, two of which belonged to the "protected" genus *Euplœa*, being attacked by birds, and had been driven to the conclusion that the phenomena of mimicry had nothing to do with natural selection. Papers were communicated by the Rev. F. D. Morice on "New or little-known Sphegidæ from Egypt"; and by Prof. J. F. Grote on "Changes in the Structure of the Wing of Butterflies." A special meeting was then held, at which the proposed amendments and additions to the Society's bye-laws were adopted.

South London Entomological and Natural History Society.—*May 27th*, 1897.—Mr. R. Adkin, F.E.S., President, in the chair. Mr. Bainbridge Prest, M.A., of Sydenham, was elected a member. Mr. South exhibited a box of Tephrosias, which he had purposely mixed as regards dates and localities. He asked for information as to names, but no one essayed to pick out the two forms. Mr. Auld, larvæ of *Boarmia roboraria* and *Limenitis sibylla* from the New Forest, and also larvæ of the two Phorodesmas, *P. bajularia* and *P. smaragdaria*, and remarked on the close similarity of the former, in its covering of oak remnants, to the groups of brown scales enclosing the buds on the oak twigs. Mr. Moore, male and female specimens of the remarkable Mexican Pierid, *Pyrisitia proterpia*, a bright and rich orange coloured insect. Mr. Tutt, specimens of *Ascalaphus coccjaus*, a Neuropterous insect allied to the ant-lions, from Digne, with notes on its history, variation, and occurrence. An allied species, *A. maccaronius*, was described by Scopoli as a butterfly. Mr. Edwards, a living mantis sent from Cannes by Dr. Chapman. He had had it some six weeks, and it fed readily upon small cockroaches and flies. He also showed young larvæ of *Saturnia pavonia* from ova laid by a female taken at Digne. Mr. Adkin, series of *Cidaria suffumata* from various localities, including Forres, Dover, Box Hill, and Loch Laggan. Those from the latter locality were var. *piceata*. Mr. Tunaley, specimens of the resinous nodules of pine sent him from Scotland, from which he had bred *Retinia resinella*. He also showed sections of the same, and made remarks upon the peculiarities of the cocoon and the method of emergence of the species. Dr. Chapman exhibited, among other insects, a living specimen of *Charaxes jasius*, which had just emerged from the pupa of a larva taken at Cannes. Mr. Tutt read a paper entitled "Spring Butterflies on the Riviera," and exhibited a large number of species in illustration.

June 10th.—The President in the chair. Mr. Jas. N. Smith, 28, Eastdown Park, Lewisham, was elected a member. Mr. Mansbridge exhibited a larva of *Tephrosia crepuscularia* beaten from yew, and a short series of imagines bred as a second brood from larvæ taken at

the same place last year. He stated that the larvæ of *T. biundularia* from both Yorkshire and Epping were quite distinct from the larvæ of *T. crepuscularia* in marking and coloration. Mr. Tutt remarked that the young larvæ of both species were similar to the young larvæ of the Ennomids in being black with more or less complete white rings, but said that such similarity did not necessarily show close relationship always. Mr. Malcolm Burr, a few insects from the island of Socotra, and said that at a casual glance the fauna seemed to represent a transition from the Palæarctic to the Æthiopian region. Mr. Turner, flowers of the bogbean (*Menyanthidis palustris*) and of the cinquefoil (*Potentilla comarum*) from the neighbourhood of Woolmer Forest. Mr. Lucas, ichneumons which had emerged this year from last year's cocoons of *Zygæna trifolii*, and also an earwig (*Chelisoches morio*) from Java, of which species two examples have recently been taken at Kew. In the discussion, several curious instances of parasitism were noted. Mr. Tutt mentioned a parasite on the larvæ of *Melitæa aurinia* which had three separate emergences during the life of its host. Mr. Hall said that a particular ichneumon was entirely confined to the young stage of *Cucullia verbasci*. Mr. Adkin, a series of both captured and bred specimens of *Tæniocampa gothica* from Loch Laggan. The captured examples were largely *gothicina* forms, while the latter were very typical, although the ova were from females of the former variety.—Hy. J. Turner, *Hon. Report. Sec.*

RECENT LITERATURE.

Mittheilungen aus dem Roemer-Museum zu Hildesheim. Nr. 8. Februar, 1897. Die Schmetterlingsfauna von Hildesheim. Von A. Radcliffe Grote, A.M.

Some years ago Mr. A. R. Grote, after rendering great service to the study of North American Lepidoptera, removed to Germany, and settled at Hildesheim, where he has begun to publish a series of very useful works on the classification of Lepidoptera, chiefly as worked out by the neuration. The present work is only secondarily a local list of the not very rich local fauna of Hildesheim (about eighty species of Rhopalocera), but is chiefly devoted to an elaborate description of the neuration of the families and subfamilies of butterflies, illustrated by four excellent plates. Mr. Grote does not adopt the usual German system of counting the nervures upwards, but counts them downward, like the American writers, calling the three principal nervures, radius, media, and cubitus, and numbering them iii., iv., and v. These correspond to those frequently called in England the subcostal, median, and submedian nervures respectively. Mr. Grote admits twelve families of butterflies, of which two are not represented in Europe; but it strikes us as somewhat singular that while classing together the Parnassiidæ and Papilionidæ as Parnassi-Papilionidæ, he should group the remaining ten families together as Pieri-Hesperiidæ, thus uniting the

to think that similar conditions of environment produce [illegible] the effects. Mr. J. J. Walker, Sir George Hampson, and C[illegible] this gave evidence, from personal experience in the Tropic[illegible] we do extreme rarity of butterfly destruction by birds. T[illegible] of the admitted its rarity in Africa; but stated that he [illegible] especially the Drongo shrike, chasing butterflies. [illegible] called attention to a recent paper by M. Piepers, w[illegible] twenty-eight years' observation in the Malay re[illegible], Curator instances only of butterflies, two of which belong[illegible] With an genus *Euplœa*, being attacked by birds, and h[illegible] Author of conclusion that the phenomena of mimicry [illegible] Beetles, Butter- natural selection. Papers were communic[illegible] by twenty Morice on "New or little-known Sphegid[illegible] (Swan Sonnen- Prof. J. F. Grote on "Changes in the [illegible] Butterflies." A special meeting was th[illegible] orders of insects, amendments and additions to the Socie[illegible]ons was greatly

South London Entomological [illegible] could be better as *May 27th*, 1897.—Mr. R. Adkin, [illegible] but the number of Mr. Bainbridge Prest, M.A., of Sy[illegible] small to carry the Mr. South exhibited a box of T[illegible] complete works, Cox's mixed as regards dates and local[illegible] and expensive for to names, but no one essayed [illegible] a well for a beginner to larvæ of *Boarmia roboraria* [illegible] to confuse and dis- and also larvæ of the two Phor[illegible] a smaller one, and then and remarked on the clos[illegible] has already sufficiently oak remnants, to the grou[illegible] and use them with more oak twigs. Mr. Moore, [illegible] Mexican Pierid, *Pyri*[illegible] useful to schoolboys and insect. Mr. Tutt, sp[illegible] rather to begin to collect insect allied to the [illegible] which they may happen variation, and occur[illegible] them. It was of course described by Scopo[illegible] 3000 British beetles in a sent from Cannes [illegible] ative species are figured and it fed readily [illegible] in many cases, to habits young larvæ of [illegible] contributed by Dr. W. Digne. Mr. A[illegible] as the structure, deve- including Fow[illegible] ons for collecting. latter locality [illegible] of a German work, a few resinous mo[illegible] are not included in the British bred *Retin*[illegible] want of an asterisk before remarks u[illegible] disadvantage, for it counteracts gence of [illegible] of restricting our interest a living [illegible] point of view it will be useful, pupa of [illegible] have either been reputed "Spring [illegible] England from time to time species [illegible]

Jun[illegible]

East[illegible]

exhibi[illegible]

short [illegible]

THE ENTOMOLOGIST

Vol. XXX.] AUGUST, 1897. [No. 411.

SPILOSOMA MENDICA AND ITS var. *RUSTICA* INTERBRED.

By Robt. Adkin, F.E.S.

The concluding sentence of the note on "Hybrid and Mongrel Lepidoptera" (*ante*, 197) renders desirable the publication of details of the pairing of the English and Irish forms of *Spilosoma mendica* which I obtained some time since, but which have not previously been placed on record.

The stock from which the Irish form (var. *rustica*) was reared I received as ova in May, 1886, it having then been once inbred (Proc. South Lond. Soc. 1887, p. 90), the parent moth having been taken in Co. Cork. The English stock (typical *mendica*) came to me some three weeks later, also in the form of ova, and once inbred from a moth taken in the north of London. In each case fine broods were reared in 1887, the largest Irish males measuring 40 mm. in expanse, thus comparing favourably with the only two captured Irish examples I possess, which both expand 36 mm., and the largest females of the brood measure 46 mm. The English males reared in 1887 expanded 36 mm., and the females 42 mm. Ova were obtained from both broods, but the larvæ resulting began to show signs of degeneracy, the percentage of deaths being larger than in the previous generation, especially among those of the Irish brood; and the imagines emerging in 1888 were slightly smaller, the largest Irish male being 38 mm. and females 42 mm. in expanse. Thus far the English moths had all emerged before the Irish began to appear (possibly the removal northward may have accounted for the lateness of the latter), thus preventing the possibility of the cross-pairing I so much wished to obtain. Continuing the broods, further signs of degeneracy manifested themselves; many ova did not hatch, the larvæ were sickly, and a large per-

centage died, and the few moths that came forth in 1889 were miserable little creatures; however, as a diminutive Irish male (32 mm.), one of the whitest that I had seen, and a small English female (36 mm.), happened to emerge on the same day, they were put together; on the following morning they were paired, and ova were deposited same evening. The majority of these ova showed by ultimately turning colour that the larvæ in them were alive, but only four came forth, three fed up well and pupated, the other lingered on for an unduly long time and died; but the only imagines that resulted were two full-sized males, measuring respectively 38 mm. and 37 mm. in expanse. Throughout the series of broods, due care was taken to keep the larvæ supplied with a sufficiency of fresh food and to prevent overcrowding.

The colour of the English males was uniformly the typical sooty brown; that of the Irish males varied from creamy white to pale ochreous brown, the females of both forms being alike, *i. e.*, the typical smoky white. The crossbred examples most nearly resembled the darkest of the Irish form, being of the same pale ochreous brown colour but with a smoky tone and the fringes faintly paler.

July, 1897.

CONTRIBUTIONS TO THE GEOGRAPHICAL AND VERTICAL DISTRIBUTION OF THE RHOPALOCERA IN THE HAUTES-PYRÉNÉES.

By W. Harcourt-Bath.

The following paper is the result of a preliminary visit which I paid to the Central Pyrenees, situated in the French Department of the Hautes-Pyrénées, during the latter half of July and the beginning of August last year. I have already given an account of the vertical zones, together with a brief sketch of the vegetation, in a previous article in the 'Entomologist' (November, 1896).

Although the scenery in the region under consideration is generally far grander than in that portion of the chain included in the Department of the Pyrénées-Orientales, the Rhopalocera fauna of the former is not so rich. Unfortunately I was not favoured with very good weather; half the time I was there it was either wet or dull, while during the same period the whole of Europe to the north was enjoying a drought of almost unprecedented severity; but it is generally the case that when anticyclonic conditions prevail in Central Europe, the weather further south is as a consequence bad. It was in fact one of the most rainy seasons that they have had in the Pyrenees for

long time, so that grave fears were entertained lest the grape crop should prove a failure on account of the insufficiency of the necessary amount of sunshine. Butterflies were as a consequence, with a few exceptions, neither in the best of condition nor very plentiful, at least as regards the number of individuals was concerned, but I managed to meet with a fair number of species considering; thus the total that I saw was seventy-seven, while the sum-total actually captured amounted to seventy-four, without counting varieties and aberrations.

The two headquarters of the alpine Rhopalocera fauna, as well as that of the alpine flora, is at Gavarnie and Héas, namely, in the Cirque de Gavarnie and the Cirque de Troumouse respectively, both of which localities I visited. The scenery, especially at that of the former place, is superb in the superlative degree. Every evening during my stay at Gavarnie—after a hard day's work among rocks and bushes on the rugged mountain slopes in search of butterflies—I went off to witness the magnificent spectacle of the sunset on the snow-clad summits surrounding the Cirque, or to obtain a near view of the wonderful "Cascade," the second highest waterfall in Europe, 1266 ft. in altitude, to which I felt attracted almost as if by a magnet. The best view of the celebrated Cirque is to be had about two miles along on the Bucharo Pass or Port de Gavarnie, from the summit of which, about 7500 ft. in elevation, a good view can also be obtained over the Spanish side of the chain.

The Cirque de Troumouse is also a most romantic spot, surrounded by gigantic snow-clad peaks, from the glaciers of which descend numerous waterfalls and torrents in all directions. In this lonely and wild locality the peculiar bleat of the chamois can constantly be heard from among the rocks which it so much resembles in colour, while high overhead vultures and eagles occasionally will be seen on outstretched wings soaring round some lofty crag, or wheeling in circles at immense altitudes in the air, and gliding along in the most graceful manner imaginable.

Upon several occasions I climbed above the clouds, and to my great delight found, as it were, a new world awaiting me, with butterflies flying about in the bright sunshine, while down below, many hundreds of feet, they were all wrapped in sleep beneath the nubiferous pall-like canopy. Only those who have experienced it can possess any conception of the excessive pleasure it is to be butterfly-hunting among these snow-clad mountains when there is an azure-blue sky overhead, and the snow-fields and glaciers glitter and shine like diamonds all around.

The scenery at the lower elevations is also very magnificent. All along by the side of the road usually runs a roaring torrent, locally known as a "gave," which rushes and foams among

moss-covered rocks and boulders with a deafening noise; frequently it is seen at the bottom of a steep ravine three or four hundred feet in depth, while the mountains rise immediately above the path in a precipitous manner, forming romantic gorges and defiles, such as the Gorge de Pierrefitte and the Gorge de St. Sauveur, box and arborescent heath, besides a multitude of other shrubs, trees, and plants, growing out of the crevices of the rocks in all conceivable ways and means. Landslips and other convulsions of nature have produced some wonderful wildernesses and scenes of desolation in certain places, such, for instance, at the Chaos of Héas and the Chaos of Gèdre, where rocks and boulders of all shapes and sizes are strewn about in endless confusion for several miles in extent. On a moonlight night especially the appearance they present is weird in the extreme. Here and there they produce a most remarkable life-like appearance, many of the rocks being vested with almost a human aspect as they rise above the sky-line in all sorts of angles and attitudes.

The scenery of the Pyrenees is on the whole wilder than that occurring in the Alps, at least according to what has been my experience as the result of three visits to the latter range; but it is certainly not so grand, although here and there it is almost equally magnificent. Accommodation is not so good as in the Alps, there being no hotels or mountain châlets at high altitudes, so that much more exertion is necessary in order to reach elevated situations. Instead of roads one has frequently to traverse a narrow track or mule-path in order to visit some out-of-the-way village, such as Héas, where the fastidious may not find the food always to their satisfaction, although I am prepared to rough it wherever I go.

The following is a list of the Rhopalocera which I met with in the Hautes-Pyrénées; no mention is made therein of those which I obtained on the Spanish side of the chain, as they would be out of place in this paper. I have also given the localities, the approximate altitudes above the sea-level in parentheses, and added a few notes respecting morphology and relative frequency, &c.

Papilionidæ (three species).

Papilio machaon. Scarce; Gorge de Pierrefitte, Port de Gavarnie (2000–5500 ft.). Ground colour rich yellow.

Parnassius apollo. Abundant everywhere, especially at the Gorge de Pierrefitte, Héas, Gavarnie, Chaos de Gèdre, &c. (2500–6500 ft.). The sexual dimorphism is very pronounced, the males being respectively lighter and the females darker than is the case in the Alps. I obtained between fifty and sixty ova from one female, which I kept in a warm room upon my return home, and they all hatched out between the 2nd and the 4th of January this year. Not having any sedums to

feed them on, I supplied them with "London pride" and *Arabis alpina*, the nearest representatives of the saxifrages which the larvæ are said to live upon, both plants being plentiful in the Pyrenees; but they would not touch them, and in consequence all died. The ova are round, somewhat concave at the sides, possessing in this respect a superficial resemblance to a broad bean. They are of a slaty grey colour, and possess a very tough epidermis. The young larvæ were very lively, and crawled about with a rapidity more like the caterpillars of certain Bombyces, to which also the ova possess a close resemblance. —*P. mnemosyne*. Cirque de Gavarnie and Cirque de Troumouse; single specimens only (5000–5500 ft.).

PIERIDÆ (nine species).

Aporia cratægi. Very abundant everywhere, especially at Gavarnie, St. Sauveur, and Pierrefitte (1800–5500 ft.). Among the series obtained are some dwarf specimens, produced probably by semi-starvation.

Pieris rapæ. Scarce, except at Pierrefitte, Gavarnie, and St. Sauveur (1800–5000 ft.). Variable in size.—*P. napi*. Scarce; Pierrefitte, St. Sauveur (1800–3000 ft.). At both localities I obtained representatives of the first and second broods. Those of the latter are of the South European type, being very large and white with very pale yellow under sides, the veins being indistinct, in which latter particular similar specimens occur in the Midlands and South of England during very hot summers as occasional aberrations of the second generation.—*P. daplidice*. One specimen at Gavarnie (5500 ft.). It is intermediate between the type and the var. *bellidice*.—*P. callidice*. Port de Gavarnie (6500–7000 ft.). Saw several specimens, but did not succeed in capturing any, as their flight is exceedingly swift, making it difficult to chase them over rocky ground.

Leucophasia sinapis. Scarce; Pierrefitte, St. Sauveur (1800–3000 ft.).—Var. *diniensis*. One specimen at Pierrefitte (1800 ft.).

Colias edusa. Scarce; Pierrefitte, Gavarnie (1800–5500 ft.).—*C. phicomone*. One specimen at Gavarnie (5500 ft.). (I did not see *C. hyale* at all in the Pyrenees, but observed many specimens of it when travelling through France by rail.)

Rhodocera rhamni. Scarce; Pierrefitte, St. Sauveur, Gavarnie (1800–5500 ft.).

LYCÆNIDÆ (nineteen species).

Thecla ilicis. A few specimens, but worn, in the Gorge de Pierrefitte (2500 ft.). (I saw specimens of another *Thecla* near the Port Napoleon at St. Sauveur, flying about the tops of the trees in the ravine, but was unable to get near enough to identify same.)

Chrysophanus virgaureæ. Abundant and generally in good condition at Gavarnie and Héas (5000–6000 ft.). Many of the males possess a black discoidal spot on the anterior wings, but I did not meet with the var. *meigii*.—*C. hippothoë*. Abundant and in tolerably fair condition at Héas and Gavarnie (5000–5500 ft.). The females are very variable as regards size, and they often possess a melanochroic tendency, but I saw nothing in either sex approaching the alpine var. *eurybia*.—*C. dorilis*. Common but worn at Gavarnie (5000–6000 ft.).—Var.

subalpina. Gavarnie; more abundant than the type (5000–6000 ft.). —*C. gordius*. Gavarnie, St. Sauveur, Pont de Scia (3000–5500 ft.). Exceedingly fine specimens occur in the Pyrenees with a very vivid violet reflection, but I only took a small series.

Lycæna ægon. St. Sauveur, Gèdre, Héas, and Port de Gavarnie. Exceedingly abundant at the latter locality (3000–7000 ft.). Most of the male specimens possess wide black borders to all their wings, as in the Alps at the lower elevations.—*L. argus ?*. Gavarnie (5500 ft.).—*L. orbitulus*. Gavarnie; scarce (5000 ft.).—*L. eros*. One worn specimen, Port de Gavarnie (6000 ft.).—*L. icarus*. Scarce at Pierrefitte and St. Sauveur (1800–3000 ft.). — *L. eumedon*. One specimen at St. Sauveur (3000 ft.).—*L. escheri*. A small series at St. Sauveur, Héas, and Gèdre (3000–5500 ft.). Smaller in size than those found in the Alps.—*L. astrarche*. Scarce at Pierrefitte, Gèdre, Gavarnie, and Héas (1800–5500 ft.).—*L. bellargus*. One specimen at St. Sauveur (3000 ft.). —*L. corydon*. Abundant; Port de Gavarnie, Héas, Gèdre, Pont de Scia (3000–5500 ft.). Rather small, but richly coloured specimens.—*L. hylas*. Abundant; St. Sauveur, Port de Gavarnie, Héas, Gèdre, Pont de Scia (3000–5500 ft.). — *L. minima*. Scarce; Héas, St. Sauveur, Port de Gavarnie (3000–5500 ft.).—*L. semiargus*. Scarce; Port de Gavarnie, Héas (5000–5500 ft.).—*L. arion*. Not common; Pierrefitte, Héas, Gavarnie (1800–5500 ft.). The specimens resemble those found in the Alps, which are not so blue as those occurring in the plains.—Var. *obscura*. Gavarnie and Héas (5000–5500 ft.).

Apaturidæ (two species).

Apatura ilia var. *clytie*. One worn specimen at St. Sauveur (3000 ft.).—*A. iris*. I believe I saw a specimen of this insect at Pierrefitte (1800 ft.), but as it is very scarce and local in the Pyrenees, I will not be sure.

Nymphalidæ (nineteen species).

Limenitis camilla. Scarce at St. Sauveur and Gorge de Pierrefitte (2500–3000 ft.).

Vanessa c-album. Not uncommon at Gèdre and St. Sauveur (3000–3500 ft.). The light form only.—*V. urticæ*. A few specimens at Gavarnie and Héas (5000–6000 ft.). Larvæ abundant at the former locality on nettles.—*V. antiopa*. One very worn hybernated specimen at Gèdre (3500 ft.).—*V. atalanta*. Not uncommon at Pierrefitte, St. Sauveur, Gèdre, Port de Gavarnie (3000–7500 ft.). On the last-named pass I saw a specimen at the summit which possessed a predilection for settling upon the stone which marks the boundary between France and Spain.—*V. cardui*. Scarce; Port de Gavarnie (5500 ft.). Saw a few larvæ at Héas feeding on thistles.

Melitæa phœbe. One specimen at Gèdre (3500 ft.).—*M. didyma*. Not common; Port de Gavarnie, Gèdre, Gorge de Pierrefitte (2000–5500 ft.).—Var. *alpina*. Occasionally with the type. — *M. athalia*. Héas, St. Sauveur, Pierrefitte (1800–5500 ft.). Variable, but not abundant, except at Pierrefitte, where, however, it was rather worn.—*M. parthenie*. Rather scarce; Port de Gavarnie, Héas (5000–6500 ft.). Somewhat intermediate between the type and the alpine var. *varia*.—

M. dictynna. Not uncommon at Pierrefitte, Cirque de Gavarnie, and Cirque de Troumouse (1800–5500 ft.).

Argynnis euphrosyne. One worn specimen at Gavarnie (5500 ft.). —*A. pales.* Not uncommon at Gavarnie and Héas (5000–6000 ft.).—Var. *isis.* Héas (5500–6500 ft.).—*A. dia.* Scarce at Pierrefitte (1800 ft.).—*A. latonia.* One specimen at Héas (5000 ft.).—*A. aglaia.* Abundant and in good condition; Gorge de Pierrefitte, Gèdre, Gavarnie, Héas (2000–5500 ft.).—*A. niobe* var. *eris.* Abundant at Gavarnie, at the base of the Pic de Pimené (5000–5500 ft.). Under side much lighter than in the Alps, and markings more obscure. The type does not occur at all.—*A. adippe.* Not common; Pierrefitte, St. Sauveur (1800–3000 ft.).—Var. *cleodoxa.* Gèdre (3500 ft.), where it replaces the type.—*A. paphia.* St. Sauveur (3000 ft.).

SATYRIDÆ (sixteen species).

Melanargia galatea. Very abundant and in good condition, except at the lower altitudes; Valley de Lanedan, Pierrefitte, St. Sauveur, Gèdre, Pont de Scia, Port de Gavarnie (1500–5500 ft.).

Erebia epiphron var. *cassiope.* Port de Gavarnie, Héas (5500–6000 ft.).—Var. *pyrenaica.* Port de Gavarnie, Héas (5500–6000 ft.). Abundant, but local. Intermediate forms between the two varieties are of frequent occurrence, so that it is often a difficult matter to separate them.—*E. manto* var. *cæcilia.* A small series at Héas, in good condition and apparently only just emerging (5000–5500 ft.).—*E. stygne.* Exceedingly abundant at Port de Gavarnie, Héas, Chaos de Gèdre (4500–7500 ft.). This is by far the most common species of *Erebia* in the Pyrenees, but does not exhibit a great amount of variation, except as regards the ocellation. It is a positive nuisance in some places.—*E. melas* var. *lefebvrei.* Common on the summit of the Port de Gavarnie, but very worn (7000–8000 ft.). I think this species is here intermediate between the variety named and the type.—*E. tyndarus* var. *dromus.* Very abundant; Port de Gavarnie, Cirque de Troumouse, Héas (5500–8000 ft.). This insect is a beautiful object when flying, the wings flashing with an iridescence in the bright sunshine like flakes of silver.—*E. gorge.* One specimen at Héas (6000 ft.).—Var. *gorgone.* Port de Gavarnie (6000–7500 ft.). A small series, but in good condition.—*E. euryale.* Héas; very abundant (5500–6500 ft.).—Var. *euryaloides.* Three specimens of this interesting variety at Héas (5500–6500 ft.). They are quite black and unspotted, and I think they must be identical with the form found in Lapland. I am not aware that it has been recorded from the Pyrenees before. The species varies considerably here in the degree of ocellation, the variety named being the extreme form in this respect.

Satyrus alcyone. St. Sauveur, Gèdre, Pont de Scia (3000–3500 ft.). A small series, but in good condition. This insect loves to settle upon rocks by the roadside, like most of the other members of the genus.

Pararge mæra var. *adrasta.* Exceedingly abundant at Pierrefitte, Gèdre, Gavarnie, and Héas (1800–6000 ft.). All the specimens which I took can, I think, be referred to this South European form; the females most certainly can be. I did not meet with any specimens even at the highest elevations so dark as is the type in the Alps.—*P.*

megæra. One specimen at Gavarnie (5500 ft.).—*P. egeria.* Pierrefitte, Gèdre (1800–3500 ft.). A small series only. I do not think the var. *egerides* occurs here at all.

Epinephele ianira. Abundant everywhere, especially at Gèdre, Pierrefitte, St. Sauveur, Gavarnie, and Héas (1800-5500 ft.). The Austral var. *hispulla* occurs with the type at all altitudes as an aberration.—*E. tithonus.* A few specimens at Pierrefitte and St. Sauveur (1800–3000 ft.). The borders of the wings are very dark.

Cœnonympha arcania. Very plentiful, especially at St. Sauveur and Port de Gavarnie (3000–5500 ft.).—*C. pamphilus.* Not uncommon at Port de Gavarnie and Héas (5000–6500 ft.). As in the Alps, the markings upon the under side of the posterior wings are very obscure, and the ocellation almost entirely absent. Altitude does not appear to have anything to do with it. One male specimen possesses a melanic tendency, being thickly clothed with black scales on the upper side, while a female I took is very large and of a rich orange colour, much more intense than the type.

HESPERIDÆ (nine species).

Spilothyrus altheæ. Not uncommon at St. Sauveur, Gèdre, and Pont de Scia (3000–3500 ft.), settling upon the middle of the road, and possessing a special predilection for horse-manure.—*S. lavateræ.* Two rather small specimens at Gavarnie (5000–5500 ft.).

Syrichthus carthami. Plentiful at St. Sauveur, Port de Gavarnie, Héas, and Gèdre (3000–5500 ft.). Fond of settling upon the road.—*S. alveus.* Plentiful at Héas (5000–6000 ft.).—*S. sao.* Single specimens at St. Sauveur at Gavarnie (3000–5000 ft.).

Hesperia thaumas. Scarce; Gavarnie, Gèdre (3500–5500 ft.).—*H. lineola.* Scarce; St. Sauveur, Héas (3000-5500 ft.).—*H. actæon.* Scarce; St. Sauveur, Gèdre (3000–3500 ft.).—*H. sylvanus.* A few specimens at Pierrefitte, St. Sauveur, and Gavarnie (1800–5500 ft.).

Birmingham, January 25th, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

BY W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Continued from p. 131.)

ACIDALIA REMUTARIA, *Hb.*—This insect seems somewhat restricted in distribution to the south and west, where in some localities it is very abundant. On the east coast Professor Hart reports it from Castle Bellingham, Co. Louth, and Birchall gives Wicklow. About Killarney and Kenmare it is very common; on the shores of L. Derg and Lower Shannon; Clonbrock, Castle Taylor, and Merlin Park, Co. Galway; Knocknarea (*R.*), and abundant at Rockwood, Sligo. The var. *lactata*, Haw., occurs at Killarney with the type.

ACIDALIA FUMATA, *St.*—Said by Birchall to be widely distributed. I have rarely taken it, but may have overlooked it. Killarney and Caragh L. Kerry; Framore, Co. Waterford; and Clonbrock, Co. Galway.

ACIDALIA IMITARIA, *Hb.*—Cork and Kerry (*B.*); Tinahely, Co. Wicklow, not rare (*Bw.*); Portmarnock, Co. Dublin (*Low*).

ACIDALIA AVERSATA, *Hb.*—Both the pale and ochreous forms are widely distributed and abundant. The var. *spoliata* seems rare.

ACIDALIA INORNATA, *Haw.*—Rare. Kingstown (*B.*); Derry (*C.*); and Birchall and myself both have captured it at Killarney.

TIMANDRA AMATARIA, *L.* — Galway (*B.*), Clonbrock, a few (*R. E. D.*); Kerry (*B.*).

CABERA PUSARIA, *L.*—Extremely common.

CABERA ROTUNDARIA, *Haw.*—Whether this is a true species or not has been questioned. The late Stephen R. Fetherston-H. bred two very striking examples from larvæ taken by him at Glenmore, Crossmolina, Co. Mayo. They are now in the Museum of Science and Art, Dublin.

CABERA EXANTHEMATA, *Scop.*—Very abundant everywhere. I have a curious form from Co. Tyrone in which the first and second line approximate just below the costa on both fore and hind wings, with a shaded patch at the junction.

BAPTA TEMERATA, *Hb.*—A local insect, though its food-plant is widely spread through Ireland. Abundant in many parts of Galway, such as Clonbrock and Merlin Park; also at Ardrahan. At Mucross, Killarney; Powerscourt, Wicklow, a few.

BAPTA BIMACULATA, *Fb.*—Several stated to have been taken at Clonbrock by the Hon. R. E. Dillon. It was recorded in error, I believe, by Birchall from Killarney, as also MACARIA NOTATA, of whose occurrence I have been able to get no Irish records whatever.

MACARIA LITURATA, *Clerck.*—Widely distributed. Near Dublin; Bray, Powerscourt, and Greystones, Co. Wicklow; near Milepost, Kilkenny (*Wyse*); Cappagh, Co. Waterford; Ballyvourney, and Macroom, Co. Cork; Kenmare and Killarney abundant, Kerry; Mote Park, Roscommon; Clonbrock, Dalyston (*R. E. D.*), and elsewhere in Co. Galway; Rathowen (*Curzon*), and Killynon, Co. Westmeath; Agher, Co. Meath (*Miss R.*); Newcastle, Co. Down (*Bw.*).

HALIA VAUARIA, *L.*—Curiously enough, though existing in Ireland, it is extremely scarce. Single specimens for the most part have been taken at Powerscourt, Co. Wicklow; Howth, a

few (*M. F.*); Castle Bellingham (*Thornhill*); Favour Royal, Tyrone; Derry, a few (*C.*); Cromlyn (*Mrs. B.*), Westmeath; Rockwood, Sligo; Clonbrock, three (*R. E. D.*), Co. Galway; and Killarney.

HALIA BRUNNEATA, *Thnb.*—No Irish capture recorded except one specimen at Clonbrock (*R. E. D.*).

STRENIA CLATHRATA, *L.*—Occurs throughout Ireland here and there in meadows. Is very variable in the breadth of the black markings, of which the transverse streaks offer every possible variety of mutation. In a series of specimens, each streak in turn may be found to be broad, attenuated, or almost obsolete, the rest being normal; so that a long list of aberrations could easily be compiled if it served any scientific purpose. The ground colour is sometimes yellowish, but usually nearly white, but examples occur in which it is dusted with dark specks.

PANAGRA PETRARIA, *Hb.*—Local, but abundant where found. Wicklow (*Bw.*); Curraghmore, abundant (*Wyse*), and Cappagh (*Miss V.*), Co. Waterford; Killarney, near Torc Waterfall, and in a glen near Sneem, Co. Kerry; Doneraile, Co. Cork (*Stawell*); Clonbrock, and Merlin Park, Galway; Mote Park, Roscommon; Toberdaly, King's Co.

NUMERIA PULVERARIA, *L.*—Very generally distributed in Irish woodlands; sometimes attaining an expanse of nearly one and a half inches. Varies in colour from a warm sepia tint to a bright ferruginous brown. An aberration from Clonbrock has the central band of the fore wing obsolete, excepting two dark striæ representing its outer and inner edges. This is a tendency shown by many geometers which normally have a central transverse band. Localities:—Clonbrock, Merlin Park, Moycullen (*Miss R.*), Kylemore (*Hon. E. Lawless*), and Ardrahan (*Miss N.*), Co. Galway; Rockwood, near Sligo, abundant, and Markree; Farnham, Cavan; Altadiawan, and Favour Royal, Co. Tyrone; Drumreaske, Co. Monaghan; Ballycastle, Co. Antrim, and on the shores of L. Foyle; Powerscourt, Co. Wicklow; Ardtully (*Miss V.*), and Killarney, &c.

SCODIONA BELGIARIA, *Hb.*—Frequently met with on bogs through Ireland, but I have never found it in numbers. Near Cromlyn, and Killynon, &c., in Westmeath; Mohill, Co. Leitrim; about Ballinasloe, not rare, Clonbrock (*R. E. D.*), and Kilcornan, Co. Galway; Markree, and hills above Rockwood, Sligo; Altadiawan, Tyrone; Mourne Mts. (*W.*); Churchill, Co. Armagh (*J.*); near Clondalkin, Co. Dublin (*Grierson*); Glandore, and Castletownsend, Co. Cork (*D.*); Castletown, Berehaven (*Carpenter*), and Killarney, Kerry; Giant's Causeway (*Bw.*); and a few near *Derry (C.)*.

SELIDOSEMA ERICETARIA, *Vill.*—Strangely enough, this moth, so local in England, is widely distributed through the central, southern, and western heathy tracts of Ireland, occasionally in some numbers. In France it is very local, and never very abundant, on warm hillsides (*Berce*). It is shy, and a fast flier on hot days, but towards dusk is more easily netted. Common at Killarney (*B.*), and in a field near the Sneem oyster-beds, Co. Kerry (*R.*); Kinsale, abundant, Co. Cork (*S.*); near Fannin Lock, on the Ballinasloe Canal, not rare; Clonbrock, one (*R. E. D.*), and Recess (*Wolfe*), Co. Galway; Mote Park, Roscommon; Killynon (*Miss R.*), and Cromlyn (*Mrs. B.*), Co. Westmeath; Churchill, Co. Armagh, in numbers (*J.*).

EMATURGA ATOMARIA, *L.*—Everywhere abundant on heaths. Variations are numerous in both sexes, but I have never met with a form in Ireland which seems local at Folkestone, and occurs of large size in Switzerland, the males reaching almost one and a half inches in expanse. It is characterised by the deep and regular serration of the outer edge of the elbowed line, and the ground colour clearer and less dusted with black in both sexes. The males are especially bright, the pale band beyond the elbowed line being bright ochreous, almost unspeckled. Considering how handsome a form the continental specimens assume, it would seem worthy of enquiry whether it occurs elsewhere in England, perhaps in chalk districts; and if local, it deserves a varietal name. The females are less remarkable, the serrations being principally shown on the band of the hind wings.

BUPALUS PINIARIA, *L.*—Very local in Ireland, but there abundant. Donard demesne, near Newcastle, Co. Down (*Bw.*); Co. Wicklow (*G. Foster*), where Professor Hart has met with it since abundantly over a considerable area about Glendalough; Doneraile, Co. Cork, three (*Stawell*); near Milepost, Co. Kilkenny (*Wyse*); var. *flavescens*, Agher, Co. Meath (*Miss R.*).

[SCORIA DEALBATA, *L.*—Recorded by Birchall from Killarney, but he also stated (*in litt.*) that the locality of occurrence was near Dublin. An error has apparently crept in, and the record must be deleted.]

STERRHA SACRARIA, *L.*—One specimen at Killarney in 1864 (*B.*).

ASPILATES STRIGILLARIA, *Hb.*—This is abundant where found, but I consider it is rather local, though it occurs in most counties which possess bogs. I have met with it in Sligo, Galway, Mayo, Kerry, and Westmeath.

[ASPILATES OCHREARIA, *Rossi.*—Birchall's locality of Powerscourt, Co. Wicklow, wants confirmation.]

ASPILATES GILVARIA, *Fb.*—Very local and scarce. Powerscourt

(*B.*), and Howth, one or two specimens (*G. V. H.*); Kilcornan (*B.*), Ardrahan (*Miss N.*), and Clonbrock, three (*R. E. D.*), Co. Galway; Magilligan, Co. Derry (*Curzon*).

ABRAXAS GROSSULARIATA, *L.*—Very common.

ABRAXAS SYLVATA, *Scop.*—Very local and not usually numerous. Mr. Bristow took one at Coolkenna, Co. Carlow (not Wicklow, as stated in Birchall's 'Catalogue'). At Killarney fairly abundant on Torc, and Mr. Watts took one at Tower Lodge. Two at Clonbrock (*R. E. D.*), one of them having the ground colour clouded with grey on the outer half of all the wings.

LIGDIA ADUSTATA, *Schiff.*—Not often met with in the east or north. Occurs not infrequently in many southern counties, but appears generally pretty common west of the Shannon. Howth, scarce; Co. Wicklow (*B.*); Clonbullogue (*C. S.*), and Banagher, King's Co.; Mucross, and the Cloonee Lakes, Kerry; Clonbrock, very numerous (*R. E. D.*), Ardrahan, Moycullen (*Miss R.*), Merlin Park, &c., Co. Galway; on the shores of L. Derg, Tipperary, &c.

LOMASPILIS MARGINATA, *L.*—Apparently common everywhere, and very variable, some showing the central series of spots confluent, and forming a continuous band, while in others they are obsolete. Var. *pollutaria*, Markree, Sligo; Killynon, Westmeath; Cratloe, near Limerick, Ardtully, Co. Kerry.

(To be continued.)

NEW SPECIES OF SOUTH AMERICAN EUMOLPIDÆ.

By MARTIN JACOBY, F.E.S.

(Concluded from p. 196.)

CHALCOPHANA FULVOCINCTA, n. sp.

Fulvous; the terminal joints of the antennæ, the abdomen, and the tarsi black; thorax sparingly punctured; elytra bright metallic green, the epipleuræ narrowly fulvous, the punctuation strong and regular in single rows. Length 2½–3 lines.

Head finely but rather closely punctured, fulvous; antennæ long, extending below the middle of the elytra, black, the lower five or six joints fulvous; thorax twice as broad as long, the sides nearly straight, narrowed in front, the anterior angles slightly produced, the surface irregularly but rather distinctly punctured, fulvous; scutellum fulvous; elytra strongly convex, with a slight depression below the base, strongly punctured in closely approached and regular rows, bright metallic green, the epipleuræ fulvous; the breast and the legs fulvous; the abdomen and the tarsi black.

Hab.—Bolivia.

I only know the male of this species, several specimens of which are contained in my collection. It is the only one known to me in which the elytral epipleuræ alone are fulvous and the abdomen black, and will therefore not be difficult to distinguish. Another again closely allied species from the same locality is the following.

Chalcophana Oberthuri, n. sp.

♀. Rufous; the abdomen and the penultimate tarsal joint black; thorax finely and sparingly punctured; elytra greenish-æneus, closely punctate in single rows, the sides with three costæ of variable length, the lateral margin fulvous, apex dentate. Length 4 lines.

Head rather closely punctured at the vertex only, rufous; antennæ entirely fulvous, the lower six joints shining, the rest opaque; thorax twice as broad as long, the sides slightly rounded at the middle, the anterior angles produced, the disc rather closely, distinctly but irregularly punctured; scutellum rufous; elytra with a shallow depression below the base, the apex of each produced into a short tooth, the surface moderately strongly, closely, and regularly punctured in single rows, the sides with three costæ, the inner one commencing at the shoulder and extending obliquely downwards to the middle, the second much shorter and ending in a line with the preceding one, the third near the lateral margin and continued more or less distinctly towards the apex, the latter portion again strongly raised, the surface of a greenish-æneus colour, the extreme lateral margin and the epipleuræ rufous; abdomen bluish black; the rest of the under side and the legs rufous; the third joint of the tarsi and the claws blackish.

Hab.—Bolivia.

Of this species there are two females before me; in one the antennæ are partly wanting, and I cannot say therefore if their entirely fulvous colour is constant; this is, however, the case in regard to the colour of the tarsi in both specimens and that of the abdomen. *C. peruana*, Har., is certainly very closely allied; but in my specimen of that species (which was obtained by the same collector and at the same locality as the type) the elytra are greenish blue, the antennæ are black with the exception of the lower three joints, and the entire tarsi are of the latter colour, while the elytra are more finely punctured and without the rufous margins or apical teeth.

Chalcophana longicornis, n. sp.

Rufous; the antennæ (the basal three and the apical two joints excepted), the tibiæ, tarsi, and the abdomen black; elytra dark blue, geminate punctate-striate with slightly convex interstices, their epipleuræ rufous. Length 3 lines.

♀. Head finely and closely punctured, with a short central groove; antennæ as long as the body, black, the basal three and the apical two joints fulvous; thorax about one-half broader than long, the sides strongly rounded, the anterior angles acutely produced in shape of a

mouth, the surface very finely and rather closely punctured; scutellum dark fulvous; elytra dark blue, not visibly depressed below the base, strongly punctured in double rows, the interstices in shape of slightly raised longitudinal narrow spaces, the epipleuræ and the extreme lateral margin at the basal and apical portion fulvous; the breast and the femora of the latter colour, the posterior femora with a piceous spot at the posterior portion; the greater part of the tibiæ, the tarsi, and the abdomen black.

Hab.—Amazons.

This is another species having the abdomen black, but differs in the long antennæ and their fulvous apical joints, and in the colour and strong punctuation, arranged in pairs, of the elytra. I possess a single male specimen.

CHALCOPHANA (?) DUODECIMPUNCTATA, n. sp.

Fulvous; the intermediate joints of the antennæ black; thorax very finely punctured; elytra similarly punctate, each with six black spots (2. 2. 2.). ♂. The intermediate tibiæ deeply emarginate at the apex, the latter with a spine. Length 3 lines.

Head, with the exception of a few fine punctures between the eyes, entirely impunctate, the middle with a fovea; antennæ slender, extending to the middle of the elytra, fulvous, the sixth, seventh, and eighth joints black, the fourth joint slightly shorter than either the preceding or following one; thorax rather more than twice as broad as long, the sides angulate at the middle, very narrowly margined, all the angles produced into a tooth, the surface very finely and rather closely punctured, the posterior margin slightly produced and rounded at the middle; scutellum smooth, fulvous; elytra convex, without basal depression, finely punctured in closely approached rather regular rows, each with six round black spots, placed transversely, of which two are placed at the base, two before, and two immediately below the middle; under side and legs paler than the upper surface; the intermediate tibiæ with a deep emargination at the apex, the latter provided with a spine-like process; the first joint of the posterior tarsi nearly as long as the following joints together; claws appendiculate; prosternum deeply bilobed at the base; the first joint of the anterior tarsi very broad.

Hab.—Peru.

The single male specimen contained in my collection scarcely [illegible] any of the genera placed amongst the *Chalcophanæ*, but [illegible] best with *Chalcophana* in general shape, that of the thorax [illegible] prosternum, and as the curious tibial structure may only [illegible] in the male, I have thought it best not to erect a new [illegible] character alone. *Lamprophæs* has also a slight [illegible] of the intermediate tibiæ, but differs quite in the [illegible] thorax, and the mentioned emargination is nothing [illegible] as in the present insect, which would have to [illegible] special genus should other similarly structured [illegible]

NOTES AND OBSERVATIONS.

THE SPHINGIDÆ OF BIRMINGHAM AND DISTRICT.—The following is a list of the Sphingidæ which either do occur or have occurred within a radius of twelve miles of the city of Birmingham. It will be noticed that it includes every British species, with the exception of *S. pinastri* and *D. euphorbiæ*, a distinction which few local faunas can boast of. The species marked with an asterisk have been duly recorded in the literature of the time, chiefly the 'Entomologist.'

Acherontia atropos: very intermittent in its appearance; was fairly abundant in the larval stage last year in many localities; otherwise it is only a casual visitor.

**Sphinx convolvuli:* sometimes not uncommon; a larva was once found in a suburb of Birmingham; the imago has been taken at Solihull, Harborne, Kingswood, and elsewhere. *S. ligustri:* plentifully and generally distributed.

Chærocampa porcellus: rare and local; the only locality that I am aware of is Sutton Park (N. Warwickshire). *C. elpenor:* Marsham Green and Northfield, rare; larva has been found feeding on the bedstraw on the canal side near Hockley Heath. **C. celerio:* an example was taken in the centre of Birmingham in October, 1868; in 1880 another occurred about two miles distant. **C. nerii:* this grand insect, the rarest of our Sphinges, was taken in a garden in 1869, not two miles distant from the city. It went into the collection of Mr. Fred. Enock.

**Deilephila galii:* two examples have occurred; one in the centre of Birmingham, and another hovering over honeysuckle at Halesowen, some seven miles distant; both in 1870. **D. livornica* (*lineata*): one near Birmingham and another in a garden at Bromsgrove in 1870.

Smerinthus ocellatus: common. *S. populi:* common. *S. tiliæ:* rather scarce, chiefly as larvæ.

Macroglossa stellatarum: common, but local; occurs every year around Knowle. *M. bombiliformis:* very local; occurs sparingly between Knowle and Hockley Heath, together with *M. fuciformis.* —AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, July 6th, 1897.

MELANISM AND CLIMATIC CONDITIONS.—Since my criticism on Mr. Harcourt-Bath's paper (*ante*, p. 97) has been thought inadequate, I consider it only fair to that gentleman to enter into a fuller explanation of my meaning. To economise space I will merely recapitulate the chief points of the subject. Mr. Bath argues that melanism was originally adaptive, that is, that dark coloration was beneficial to Lepidoptera procryptically. Melanic varieties, according to his view, originated at low levels for this reason. *Objections.*—(1) There is no reason to suppose that dark coloration, as a general principle, means nonconspicuous coloration in all low-lying country; procryptic coloration, as far as we know, is more special. (2) Our indigenous Lepidoptera tend to darker coloration than continental specimens (see Mr. Weir's remarks, quoted in my first paper); if melanism is procryptically adaptive, continental species would be affected to the same degree as British, &c. (3) Certain insects, inhabiting environs

of manufacturing towns, exhibit melanic variations, which become perceptibly commoner with the increase of manufacturing industries. How do we account for this? Lord Walsingham's theory is physically sound and theoretically adequate; and I claim this to be the explanation of that particular phenomenon. How does this affect Mr. Bath's theory? Objections (1) and (2) point to the uncertainty of melanism being procryptically adaptive, but here we have a process going on under our eyes. Therefore I do not think it illogical to presume that the cause which originated melanism is the same as the cause of its rapid increase, when that cause is proportionately augmented.—G. W. Smith; College, Winchester.

Lycæna arion in Gloucestershire.—Readers of the 'Entomologist' will doubtless be pleased to learn that although the area formerly occupied by the "large blue" is sadly diminished, it yet holds its own in one or two localities. My colleague, Mr. J. Mountney, visited the Cotswolds on the 7th and 14th of June, and found it sparingly distributed on the spot discovered by my son three or four years ago. On the earlier date it was just appearing; on the later one, doubtless owing to some rough weather in the interval, was getting rather worn. A most careful search by him on both dates, and by myself on the later one, led us to believe that it is quite extinct in the old "Painswick" district. On my visit there last year none were found, although three were seen in the wood openings between there and Birdlip. None were noticed by us in the last-named locality this season, but we did not work it fairly.—H. W. Marsden; 40, Triangle W., Clifton.

Peronea permutana in Sussex.—I find that I have not hitherto recorded the fact that I bred two specimens of this species from larvæ found on *Rosa spinosissima* near Beachy Head in August, 1888. The specimens are both males, and rather smaller than Wallasey females of the species in my collection; the hind wings are darker.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Dianthœcia? luteago var. barretti in Cornwall.—At the meeting of the South London Entomological and Natural History Society, held on July 8th last, Major Ficklin exhibited three specimens of *D. luteago* var. *barretti* which he had recently taken on the Cornish coast. These examples differed from the Irish specimens in having the ground colour grey instead of brownish. As there appears to be some doubt as to the identity of the two previous records, these are probably the first authentic English examples of the species.

Wicken Fen.—We are very pleased to learn that a considerable portion of this notable locality, which for some time had been in the market, has been purchased by gentlemen who are entomologists. This promises well for at least one species of Lepidoptera enumerated in the list of those that should be protected from the danger of extermination.

Uniformity in Setting Lepidoptera.—I can only endorse the Editor's opinion on the above subject (*ante*, p. 175), and Mr. Dannatt will see that I have made the same remarks in regard to anybody's private opinion or taste in setting Lepidoptera. That nothing is more

difficult than to introduce reforms or alter preconceived notions, no matter how erroneous, one is more convinced of every day. In any case, the majority of the world's entomologists are of my opinion, and English colleagues will undoubtedly follow their example sooner or later.—M. JACOBY.

THE LEPIDOPTERA OF PORTLAND.—We have not seen the work, but we understand that a list of Portland Lepidoptera, by Mr. N. M. Richardson, has been recently published.

EGGS OF BRITISH LEPIDOPTERA FOR FIGURING.—Mr. E. Wheeler, The Triangle, Clifton, is figuring eggs of British Lepidoptera, and has at the present time drawn the ova of some seventy species. Further progress of the work is rather impeded by lack of material, and he would be glad to receive an egg or two of any species he is in want of.

APPLICATION FOR BRITISH PLATYPEZIDÆ.—I have been studying and describing British Syrphidæ, Pipunculidæ, and Platypezidæ, for the last few years; and while I think I have seen and described nearly all the Syrphidæ and Pipunculidæ, I have lamentably failed in the genus *Platypeza*, and I may even admit that after more than thirty years' collecting I have not seen a good pair of even one species of that genus, though about a dozen species occur in Britain. I possess various good specimens of *Callimyia;* but of *Platypeza*, though I have twenty or thirty *P. modesta*, for instance, I have not seen a single male fit for description. If anybody can send me good specimens of Platypezidæ I shall be glad to see them, and will undertake to quickly return them; and I may say that I would very willingly name any Pipunculidæ, or difficult species of Syrphidæ belonging to such genera as *Chrysogaster* or *Pipiza*.—G. H. VERRALL; Sussex Lodge, Newmarket.

CAPTURES AND FIELD REPORTS.

PLUSIA MONETA IN SURREY.—Last year I recorded the occurrence of *P. moneta* at Weybridge. This year no fewer than fourteen larvæ or cocoons have been found by myself and friends in the same garden in which they were discovered last year, on the leaves of *Delphinium*. It seems as though *P. moneta* had definitively established itself here.—(Rev.) J. E. TARBAT.

PLUSIA MONETA IN SUSSEX.—On June 30th I took two *Plusia moneta* flying over valerian in a garden near Balcombe, Sussex. They were exceedingly fine specimens both in respect of size and condition, and I took them within five minutes of one another about 9.30 p.m. Through the remainder of that evening, and through the two evenings following, I sought diligently, but no more fell to my lot.—SELWYN IMAGE; 6, Southampton Street, Bloomsbury, W.C., July 14th, 1897.

PLUSIA MONETA IN KENT.—My son caught, last night, in my garden here, *Plusia moneta*.—This makes the eighth I have taken in this locality since 1890.—R. A. DALLAS BEECHING; 24, St. James Road, Tunbridge Wells, July 21st, 1897.

EPICHNOPTERYX RETICELLA.—On May 3rd Mr. F. G. Whittle obtained larvæ of this species not uncommonly at Canvey, and Mr. J. J. Walker took one imago at Queenborough on June 6th.

SPHINX PINASTRI.—Early in June I was much surprised by the emergence, in one of my breeding-cages, of a specimen of *Sphinx pinastri*, and unfortunately I have no precise data as to its origin. As, however, I have no foreign pupæ in my possession, I can only conclude I must have received it from some one here, as I frequently receive larvæ and pupæ found in the neighbourhood. This is a pine country, but I have never heard of *Sphinx pinastri* occurring here.—(Rev.) J. E. TARRAT; Holmlea, Weybridge, July 14th, 1897.

SESIA MUSCIFORMIS (PHILANTHIFORMIS) AND DIANTHŒCIA LUTEAGO IN CARNARVONSHIRE.—When there last year I thought *S. musciformis* must occur, but could not turn it up, as the weather was bad, and I had not found out the favourite kind of thrift; so that I discovered no traces. This year (June 7th) I found pupæ numerous in dead or nearly dead plants on rocks at the very edge of the cliff, and also a good number of imagines. I also took a single specimen of *D. luteago*, var. *barretti*. I sent it to Mr. Barrett to see, thinking he might like to figure it. He pronounces it indubitable, but it was just too late for figuring. I netted it at dusk, June 7th. —F. C. WOODFORDE; Market Drayton, July 12th, 1897.

AMPHIDASYS BETULARIA *var.* DOUBLEDAYARIA IN THE LONDON DISTRICT.—Twenty years ago I took a specimen of the black form of *A. betularia* near Coombe Wood.—W. M. CHRISTY; Watergate, Emsworth, Hants.

PHORODESMA PUSTULATA IN MIDDLESEX.—I took a nice specimen of *Phorodesma pustulata* (= *bajularia*) here on June 29th. Does this insect often occur in Middlesex?—E. H. WILDE; Clay Hill House, Enfield, June 30th, 1897. [Probably not uncommon in Middlesex. The species used to be fairly plentiful in the Hampstead district, and has been recorded from Mill Hill and Harrow Weald.—ED.]

HYDRILLA PALUSTRIS, &c., AT WICKEN.—During Whitsun week at Wicken, whilst working with Morley Houghton, son of the late A. Houghton, we took two specimens of the above, one on June 5th, the other on the 7th. *M. flammea* and *A. albovenosa* were in fine condition, but other insects were not so abundant as usual owing to the lateness of the season.—E. B. NEVINSON; 3, Tedworth Square, Chelsea, S.W.

COLLECTING AT SIDMOUTH, SOUTH DEVON.—While staying at Sidmouth for a fortnight in June, I was fortunate to come across a colony of *Leucophasia sinapis* on the cliffs. They were very easy to catch, as their flight was very slow, and some kept settling on the flowers. The following butterflies were also abundant:—*Thecla rubi*, *Lycæna bellargus*, *Syrichthus alveolus*, *Hesperia tages*, *H. sylvanus*, *Euchloë cardamines*; while *Argynnis selene* and *A. euphrosyne* swarmed in Harpford Woods. Sugaring was a failure; only *Agrotis exclamationis* and *Xylophasia monoglypha* came in quantity to the bait. On the moors *Bombyx rubi* was very abundant, and I managed to net ten one day. I also took the following:—*Arctia villica* (three), *Emmelesia affinitata* (in splendid condition), *Spilosoma mendica*, *Boarmia repandata*, *Grammesia trilinea* (one variety), *Fidonia atomaria*, *Corycia temerata*, *Orgyia pudibunda*, *Euclidia mi*, *Lithosia aureola*, *Venilia maculata*, *Melanthia ocellata*, *Melanippe montanata*, *Eubolia palumbaria*,

and *Smerinthus populi*. Larvæ of *Bombyx neustria* were abundant on brambles; also single larvæ of *B. quercus* and *Odonestis potatoria*.—H. O. WELLS; Hurstfield, The Avenue, Gipsy Hill, London, S.E., July 6th.

ENTOMOLOGY IN ALDERNEY.—I have recently returned from a three months' sojourn in Alderney (April–June). The weather was windy and very rainy part of the time. Season not an early one this year. I should probably have been more successful had I been able to remain a little later on in the island, especially as regards Sphingidæ (*convolvuli, porcellus, atropos*, which are all, I am given to understand, common there). *Melitæa cinxia* proved my best catch among the butterflies. I discovered its habitat in tolerable abundance, but it is very local. In Hymenoptera and Diptera I was fairly successful; Neuroptera extremely scarce. I obtained one *Phryganea* and one *Chrysopa*, and saw one dragonfly only during the whole of the time. It flew by me over the downs and down a valley in the south-west of the island. I am almost sure it was *L. quadrimaculata*. I append a list of the Alderney insects that I know of for certain. Other kinds of the Coleoptera, Hymenoptera, and Diptera are yet to be named at the British Museum. Anyone wanting Alderney insects, for the sake of the locality, is welcome to my duplicates in return for naming said species, with the view of getting as complete a list of the island fauna as possible. The same remark applies to the Orkney insects that I obtained last year. I got one hymenopterous insect new to my collection, and only saw that one specimen, and never met with it elsewhere; it was resting on the angelica on a hill-side in Alderney. Body particularly long and slender; black, with many yellow stripes.

Rhopalocera.—*P. brassicæ* (fairly common), *P. rapæ* (fairly common), *Polyommatus alexis* (very common), *Satyrus ianira* (very abundant), *S. megæra* (not plentiful), *Vanessa cardui* (one noticed), *V. atalanta* (five or six seen), *V. urticæ* (two seen). The three last-named species are common in the island, I believe, and more were seen by others. *M. cinxia* (common in places, but very local and its range restricted), *C. edusa*, *C. phlæas* (both seen in case of stuffed birds belonging to a resident, and both common in island).

Heterocera.—*Sphinx convolvuli, D. porcellus, A, atropos, M. stellatarum, Z. filipendulæ, E. jacobææ, Arctia caia, A. menthastri, A. lubricipeda, Pterophorus pentadactylus, Camptogramma bilineata, Mamestra brassicæ, Plusia gamma.*

Hymenoptera.—*Bombus terrestris* (common), *B. lapidarius* (common), *Chrysis ignita* (two caught, two or three more seen), *Odynerus quadratus* (one specimen), *Andrena nigro-ænea?*, *A. cineraria*, *Osmia rufa?* (common on old walls), *Allantus arcuatus* (a few seen). The cylinders of the leaf-cutting bee, known as the "barrel bee" in Alderney, and believed to belong to the Andrenidæ, are common in the island a little later in the season, but not so abundant as formerly there before the fortifications of Mount Albert were erected on what is known as the Mount.

Coleoptera. — *Calathus melanocephalus, Meloë, Melolontha vulgaris, Timarcha coriaria.*

Neuroptera.—*Phryganea* (one), *Chrysopa* (one).

Diptera.—*Chlorosia formosa, Scatophaga stercoraria, Sarcophaga hæmorrhoidalis, Tipula gigantea, Bibio marci, Eristalis arbustorum, Scæva pyrastri, Calliphora vomitoria.*—(Rev.) F. A. WALKER; Cricklewood, N.W., July 20th, 1897.

SOCIETIES.

South London Entomological and Natural History Society.—*June 24th*, 1897.—Mr. R. Adkin, F.E.S., President, in the chair. Mr. W. H. Drury, F.R.H.S., Kingston-on-Thames, and Mr. J. Sandison, Wimbledon, were elected members. Mr. South exhibited the series of *Zygæna filipendulæ* taken in Middlesex, and referred to at length in Entom. for July. He was unable to draw any fine distinction between var. *hippocrepidis* and the type, and remarked that it was necessary that considerable attention should be paid to the Zygænas before any certainty could be expressed as to the specific value of the various forms. Mr. Adkin, series of *Cyaniris* (*Lycæna*) *argiolus* bred from ova and larvæ taken last autumn at Eastbourne (Proc. S. Lond. Ent. Soc. 1896, p. 110), and contributed notes.

July 8th.—Mr. R. Adkin, The President in the chair. Mr. A. Perry, Anerley, was elected a member. Mr. Lucas exhibited nymph cases of *Anax formosus* taken by himself and Mr. W. Prest at the Black Pond, Esher, in June. Mr. Auld, a fine bred series of *Phorodesma bajularia* from the New Forest. Mr. Malcolm Burr, a small collection of Orthoptera from the Persian Gulf, collected by Mr. J. H. Hiles; they were chiefly European species (see Entom. July). Mr. Ficklin, three specimens of *Dianthæcia luteago* var. *barretti* from Cornwall this year. They were very different from the Irish form, being grey in colour. This was interesting as being the first well-authenticated occurrence of the species in England. Mr. Mera, a bred series of *Hadena dissimilis* (*suasa*) from Essex, including a specimen having all the markings converted into longitudinal streaks. Mr. Turner, a bred series of *Cleora lichenaria* from Ashdown Forest, and series of several species of Coleoptera, including *Strangalia melanura* from Ranmore Common, *Cionus scrophalariæ* from Chalfont Road, and *Leptura livida* from Canvey Island. Mr. Robt. Adkin, series of *Eupithecia satyrata* var. *curzoni* bred from Shetland larvæ, and contributed notes.—Hy. J. Turner, *Hon. Report. Sec.*

North London Natural History Society.—On Friday, June 4th, 1897, members of this Society started for their annual Whitsuntide excursion to the New Forest. The majority of the party left Waterloo by the 6 p.m. train, and reached Lyndhurst about ten, the journey being an unusually long one. Mr. C. B. Smith, who was in command of the excursion, was unable to get down till the following day.

Saturday broke dull, with signs of rain, but, with their usual heedlessness of weather, several of the North Londoners were early astir, and larva-beating in Beechen Lane was tried with, alas! even less success than usual. Scarcely anything worth taking in this line seemed to be about, though the commoner sorts were plentiful enough. For once in a way, *Hybernia defoliaria* was not the commonest larva, that honour being about evenly divided between *H. marginaria* and *H. aurantiaria*. *H. defoliaria* had probably mostly gone down. Of imagines, there were found a few *Pechypogon barbalis*, *Iodis lactearia*, *Acidalia remutaria*, and one *A. straminata*. The fences only yielded a fine specimen of *Hadena genistæ* to Mr. Woodward. Being unsuccessful with larvæ, the party returned to quarters for breakfast.

About ten o'clock the weather turned out fine, and eventually became broiling hot. Though Mr. C. B. Smith was unable to be present in person, he had left an excellent programme of arrangements, the first part of which consisted of a visit to the Knightwood Oak. Accordingly, soon after breakfast, with the exception of Messrs. Harvey and Woodward, who preferred to go to Rhinefield, and the two Messrs. Smith, who had not yet arrived, the party started for the celebrated giant, though, as will be seen later on, nearly all failed to get there. Mr. L. J. Tremayne opened his entomological account with a superb little specimen of *Acidalia trigeminata*, and Mr. C. Nicholson found a field where *Euchloë cardamines* was on the wing. Proceeding, it became evident that *Pararge egeria*, in all conditions, was also flying, *Gonepteryx rhamni* was depositing, and in some cases courting. *Argynnis euphrosyne*, apparently not fully out, was seldom to be seen more than one at a time, and several of the commoner Geometræ were to be had by beating. An insect which appeared to be in greater abundance than usual was *Formica rufa*. The route taken being *viâ* Bank, the party soon entered Gritnam Wood, where larva-beating was once more tried. Presently *Tæniocampa miniosa* and full-fed *Thecla quercus*, together with a few *Psilura monacha*, began to come down. Mr. Jennings also met with some success in the Diptera, Hymenoptera, and Coleoptera. Before reaching the Lymington river, a halt was called, as it was found impossible for the ladies to continue in the heat of the sun, whereupon they, with Mr. Nicholson, senior, decided to abandon the walk. Messrs. Bacot, Bishop, and Jennings, finding collecting improving, decided to remain more or less where they were, and Messrs. C. Nicholson and L. J. Tremayne were left to push on to the Knightwood Oak alone. They first turned into Rhinefield, where the President took a fine specimen of *Macroglossa bombyliformis*, but no more were seen; another collector on the ground stated that he had been there the whole morning, and only taken three, of which one was worn. The President and Secretary subsequently, with some difficulty, succeeded in making the Knightwood Oak, the girth of which was measured and found to be 6 yards 2 feet 3 inches. But the tree is tall in proportion to its thickness, and has rather a slender appearance than otherwise from a distance. The wanderers subsequently proceeded through Mark Ash and Boldrewood, and home by the Ringwood Road *viâ* Emery Down. Messrs. Bacot and Bishop had obtained larvæ of *Asphalia ridens* and *Nyssia hispidaria*. Messrs. Harvey and Woodward, who had been at Rhinefield, had succeeded in capturing both the "bee hawks," and had turned up *Tanagra atrata* and larvæ of *Bombyx quercus*. Messrs. Jennings, Bacot, and Bishop had been attacked on the Christchurch Road by a species of *Tabanus*, which resembled *autumnalis*, but which Mr. Jennings thought must be a different species, as the specimens were worn. After tea some of the members started for evening work. To begin with, Mr. C. Nicholson knocked down a flying specimen of *Asemum striatum* in the garden, and this was one of the very best captures made during the visit. Up to the year 1893 this species had never been found in the south of England, being essentially a northern species, though occurring in a certain locality in Cumberland. At Whitsuntide, 1893, a single specimen was taken in the New Forest by

Mr. Bertram Rye, who again met with it in 1895, when he captured two specimens at Bookham, Surrey. It is, like all the Longicorns, a wood borer, and is attached to pine and fir. How it had been introduced from Scotland to the south of England, Mr. Jennings could not imagine. After this interesting capture, Messrs. C. Nicholson, L. J. Tremayne, Bacot, Bishop, W. H. Smith, with Miss Nicholson and Miss Bacot, made for Hurst Wood. Scarcely anything flew at dusk, a few *Melanippe montanata* being about the only captures, though New Park was tried as being better ground. Sugar also was an utter failure, not attracting a single lepidopteron. Larva-beating produced a few *Asphalia ridens*, *Thecla quercus*, and *Psilura monacha*. Messrs. Harvey and Woodward, however, were successful in taking *Scodiona belgiaria* on Whitemoor. Mr. C. B. Smith arrived at supper time.

A trip to Beaulieu had been arranged for Sunday, but as the day was again intensely hot, the members decided not to go so far; but a collecting party consisting of Messrs. C. B. Smith, Harvey, Bacot, Woodward, and Bishop left Lynwood after breakfast for Beechen Lane. Mr. Bishop brought out a specimen of *Epione advenaria*, and Mr. Bacot one of *Gnophria rubricollis*. *Bombyx rubi* was found commonly on the heath near Denny Bog, as well as a few *Saturnia carpini*. Mr. Woodward also took *Lithosia mesomella* and *Gnophria rubricollis*. The larvæ beaten were *Tæniocampa miniosa*, *Asphalia ridens* (a few), *Thecla quercus*, *Amphidasys strataria*, and *Psilura monacha*. The party remained out the best part of the day, and returned by the Beaulieu Road, picking up some more *Scodiona belgiaria* on Whitemoor. Mr. C. B. Smith had previously returned to dinner, and in the afternoon he and Mr. L. J. Tremayne sauntered down to the "Bombyx" heath and took several *B. rubi*, and coming back the Vice-President took a fine specimen of *Eupithecia togata* from a fence. Meanwhile Messrs. Jennings and W. H. Smith had spent the day at Rhinefield, and taken six specimens of *Macroglossa bombyliformis*. They also found several species of large Syrphidæ in numbers at the rhododendron blossoms. Amongst them were *Sericomyia borealis*, *Criorrhina oxyacanthæ*, *Volucella bombylans* var. *plumata*, and *Myiatropa florea*. *S. borealis* much resembles a wasp both in its markings and in its manner of flight, and when caught produces a loud humming noise by the vibration of the halteres, and which resembles in miniature the crying of a child. A single specimen of *Conops vescularis* was seen, but unfortunately escaped. On the way home Mr. W. H. Smith took one *Metrocampa margaritaria*, one *Geometra vernaria*, and one larva of *Catocala sponsa* beaten from an oak close to Clay Hill. The larvæ of *Diloba cæruleocephala* and *Nola cucullatella* were abundant on the banks of the Lymington river, and in Hurst Wood Mr. Jennings saw a female of *Dioctria ælandica*, one of the predatory Diptera, with its prey in its jaws. Beechen Lane and Whitemoor were the scenes of the evening work. Sugar was as useless as the previous night, and dusking only slightly improved.

On Monday, Mr. C. B. Smith, Mr. Nicholson, senior, and all the ladies except Miss Saunders, elected to drive to Rufus Stone. Miss Saunders spent the day collecting ferns in Pond Head and Jones's Enclosures and Beechen Lane. The rest of the party started for *Matley Bog viâ* Whitemoor. For Lepidoptera this was the best day

of the trip. The alder swamps in Matley Bog yielded *Hydrelia uncula*, *Eupisteria heparata*, *Hypsipetes impluviata*, and one *Erastria fasciana*; while *Aspilates strigillaria* occurred not uncommonly on the heaths, and *Drepana falcataria* was found among the birch. Mr. Jennings met with the only good weevil taken during the trip, a specimen of *Erirrhinus bimaculatus*, and also the best species of Diptera taken, *viz.* a male of *Spilomyia speciosia*, boxed from the side of the brook running through Matley Bog. This gentleman also obtained a female of *Merodon equestris* (Syrphidæ), which Mr. Nicholson had taken at flowers in the Lynwood garden. This is an introduced species, having been brought to England in bulbs, in which the larvæ feed. It is now well established in this country. The party returned home early, and after tea returned by the 7 o'clock train to town. Mr. Jennings reports the following species, other than Lepidoptera, taken during the trip in addition to those already mentioned:—Geodephaga (ground beetles), *Calosoma inquisitor* (two beaten from oaks, and one each from hazel, beech, and hawthorn), *Abax striola* (one under log on a heath), *Harpalus rubripes* (one, ditto), *Dromius 4-maculatus* (one), and one species each of *Pterostichus*, *Notiophilus*, *Harpalus*, *Calathus*, not yet named; Brachelytra (rove beetles), *Creophilus maxillosus* (one under a dead rabbit on Whitemoor); Necrophaga (burying beetles), *Silpha 4-punctata* (beaten commonly from oaks), *S. rugosa* (one), *S. sinuata* (several obtained from the before-mentioned dead rabbit), *Saprinus* (two unnamed species from the same source); Lamellicornia, *Geotrupes vernalis* (one on Whitemoor), *Trox sabulosus* (one under an old rag at a spot where there had evidently been a gipsy encampment), *Melolontha vulgaris* (several beaten from oaks), *Phyllopertha horticola* (four in various situations), *Leucanus cervus* (several); Elateridæ (click beetles), *Campylus linearis* (one out of hawthorn), *Colymbetes holosericeus* (common on oaks); Malacodermata, *Dolichosoma nobile* (one from aspen); Longicornia, *Anoplodera sex-guttata* (one on a wall), *Rhagium bifasciatum* (three), *R. inquisitor* (one at sugar in Jones's Enclosure), *Clytus arietis* (two on dead wood), *Toxotus meridianus* (one netted flying near the Lymington river at Rhinefield), *Strangalia nigra* (three from Matley Bog); Phytophaga, *Clythra quadripunctata* (one taken by Mr. Bacot at Denny), *Cryptocephalus lineola* (one from heather on Whitemoor), *Adimonia capreæ* (several), *Phytodecta viminalis* (several); Heteromera, *Lagria hirta* (one out of an oak in Hurst Wood); Rhyncophora (weevils), *Attelabus curculionoides* (two out of oaks), *Rhynchites pubescens* (several out of oaks), *Otiorrhynchus picipes* (several from hawthorn), *Strophosomus coryli* (common on anything but hazel), *Hylobius abietis* (three), *Erirrhinus tortrix* (two from aspen), *E. maculatus* (several from aspen), *Balaninus glandium* (one beaten from oak); Diptera, *Bombylius major* (one in a most dilapidated condition, having half of the wings gone, and very ragged pubescence); Hemiptera-Heteroptera, *Acanthosoma* (three specimens of a species beaten from hawthorn); a yellow species was common on oaks, and a fine green Capsid was beaten from hawthorn at Rhinefield; Hymenoptera, Tenthredinidæ, *Tenthredo maculata* (one specimen taken by Mr. Harvey near Brockenhurst).—LAWRENCE J. TREMAYNE, *Hon. Sec.*

RECENT LITERATURE.

A Study in Insect Parasitism: a Consideration of the Parasites of the White-marked Tussock Moth, with an Account of their Habits and Interrelations, and with Descriptions of New Species. By L. O. Howard. 58 pp., illustrated. Washington. 1897.

The host referred to in this interesting pamphlet is *Orgyia leucostigma*, a very close ally of *O. antiqua*, which in the United States is destructive to shade trees in cities. The author points out that, after the introduction of the English sparrow into the States, the *Orgyia* became more numerous, whilst "cankerworms," which had previously been the chief destroyers of the foliage of shade trees, were practically exterminated. In 1895 the *Orgyia* increased to an alarming extent in the city of Washington, and the author was afforded an opportunity of investigating its life-history, more especially with regard to the "prominent part which parasites take in the reduction of an insect which under favourable conditions has exceeded its normal bounds in respect to numbers." That the parasites, chiefly *Pimpla inquisitor* and *Chalcis ovata*, were doing good service is shown from the fact that at the end of August and early part of September in the year mentioned, when the *Orgyia* larvæ were most abundant, "it was an exception to find a healthy caterpillar which one of the parasites was not engaged in stinging. The rearings which were undertaken at this time show parasitism of perhaps 90 per cent. of the caterpillars." In June, 1896, "it was a very difficult matter to find enough living individuals to carry on rearing-cage experiments at the very points where they had been present the previous year by thousands and thousands," and the parasitism had reached to something above 98 per cent.

There are twenty-four original illustrations in the text.

Harrow Butterflies and Moths. Vol. II. By J. L. Bontrote, M.B.O.U., and Hon. M. C. Rothschild, F.E.S., F.Z.S. Pp. i–x, 1–112. Harrow: J. C. Wilbee. 1897.

Continues the list of Lepidoptera occurring in the Harrow district from Uropterygidæ to Alucitidæ. In the present volume there are introductory notes to some of the families and genera. There is also a supplement to Vol. I., containing additions and corrections; altogether 469 species are noticed as occurring, or having occurred, in the area dealt with.

Obituary.—We learn with regret that Mr. John Finlay, of Morpeth, died on July 4th last, at the age of sixty-one years. His interest in entomology was chiefly confined to Lepidoptera, of which order he had formed a fine collection. For upwards of thirty years he had occupied the post of head gardener at Meldon Park.

THE ENTOMOLOGIST

Vol. XXX.] SEPTEMBER, 1897. [No. 412.

THE PROTECTION OF LEPIDOPTERA.

The Entomological Society of London has entered on its work of attempting to control the too assiduous collector with commendable thoroughness; but the Protection Committee is hardly likely to propose such extreme measures as those suggested by Mr. Harold Hodge in an article on this subject in the 'Saturday Review' (July 17th). "I am not disloyal," writes Mr. Hodge, "to the entomological brotherhood; I am, and I wish to be considered, one of them; but I admit I prefer the butterflies to the entomologists." The writer then proceeds to unfold his plans for checkmating the "omnivorous collector." He says:—

"Entomologists are organised; the Entomological Society of London, as the natural head of all such societies, can declare a close season, and announce the species to which the close season is to apply. They can condemn the purchase of British insects in any stage of life from dealers. They can suspend collecting in particular localities for a specified period of time. They could, for instance, declare that there should be no collecting of the butterfly *Papilio machaon* in the egg, larva, pupa, or imago in, say, Wicken Fen for three years. It is for species whose habit is to cling to the same spot from year to year without spreading that protection is especially needed; such species, while scarce in the country generally, are plentiful where they do occur. They are thus easily grabbed by the collector, while they excite his cupidity from being, in insect-hunting parlance, 'good.' There would be no difficulty in making known the Society's edicts to the entomological world. Most collectors take in some entomological journal, or belong to some society. 'Yes; but, your rules made, promulgated, and understood, how are you to enforce them? Where is your sanction? What is the use of

making rules when you can neither compel obedience nor punish disobedience?' This difficulty would perhaps be fatal if the whole body of collectors were utterly reprobate. Happily they are not; and I believe that a large number would be strictly loyal, and the majority more or less loyal, to the decisions of the Entomological Society. This in itself would be a gain, and would rapidly create a strong public opinion. And for the recalcitrants, the reprobates, it would be the business of the loyal entomologist resolutely to take them in hand. The head Society would keep and publish a black list of offenders; it would be the plainest duty of every respectable collector to give the Society information of any offence against the code. Proved offenders would be expelled from all societies; they would be debarred from 'exchange'; they would be excluded from the pages of all entomological journals. To an entomologist this would be no light sentence. Dealers could easily be tackled. They are not, in my view, nearly so much to blame as amateur collectors, but their depredations are too serious to be passed over. Any professional 'naturalist' that sold British butterflies and moths in any stage, alive or dead, during the close season, would be placed under the ban of the Entomological Society; and collectors would be instructed not to deal with him for any purposes. (This would not, I hope, bring the officers of the Society within the law against boycotting, or make them guilty conspirators.)"

The following extract is from a paper entitled "Preservation of Rare British Animals," by Mr. John T. Carrington ('Science Gossip' for August):—

"In every division of nature and in every region of the earth there appear to be waves in the abundance and scarcity of certain species of the feral inhabitants. Returning to those of Britain, we may consider one of the most studied and best understood of the great orders—that of the Lepidoptera, or butterflies and moths. In my own time of active observation, extending to nearly forty years, we have known some species in many parts of the country which were generally common, or at least by no means rare, to have practically disappeared. As an example I may mention the 'brown-tail moth' (*Porthesia* (*Liparis*) *chrysorrhœa*), which twenty years since was a comparatively common species throughout the South of England, but is now rarely or hardly ever found. The same applies to that handsome butterfly the 'black-veined white' (*Aporia cratægi*), which was abundant half a century ago throughout southern England and South Wales. Without mentioning others, these two instances are sufficient to prove that some other agency than that of the collector must have caused their disappearance; because, in the first place, there have never been in this country a sufficient number of persons who required specimens of these once common species to have exterminated them. Neither have some of the localities

where they both abounded ever been visited by entomologist or collector. I have every sympathy with those who have founded societies for the protection of our wild birds, and brought about Acts of Parliament for their preservation. As I have said earlier in these lines, I look with abhorrence on the useless, senseless, and vulgar destruction of any kind of wild life. I admire equally the efforts which certain collectors of butterflies and moths have been making for the formation of an association to protect disappearing species in our fauna. Doubtless their efforts may prolong for a few years the stay of these species with us; but if their diminution is due to the forces of nature or to their inadaptability to accommodate themselves to human civilisation, no amount of dilettante preservation will stop their ultimate extinction. While forming these societies and advocating the abstention from collecting, humanitarians must be careful not to allow sentimental feelings to interfere with the proper acquisition of representatives of our fauna for scientific purposes. I venture, however, to hold the opinion that at no time has scientific collection caused the extinction of any species."

Everyone will agree with Mr. Carrington that the naturalist must not be denied a free hand in acquiring specimens for study; but there does not seem to be any reason to apprehend that anyone desires to interfere with him, or yet with the collector of moths and butterflies who merely wishes to complete his series of these insects. It has been considered desirable, however, that some local species of Lepidoptera should not be "worked" so closely and persistently as they have been, as the continuance of such a course may tend, it is thought, to hasten their extinction in this country, an event, by the way, which in some instances appears likely enough to occur from causes (possibly natural) about which we at present know very little indeed. Those entomologists, therefore, who have local species within their areas of observation, are asked to do all they can to foster such species, and we do not for one moment doubt that they will do so.

It will never be necessary to put in operation the pains and penalties which Mr. Hodge would mete out to the contumacious, because entomologists are quite able to effectually deal with a refractory member of the community without resorting to exceptional measures. They have been successful in the past in defeating the cunningly-devised plans of the vendor or exchanger of spurious British insects and manufactured varieties; and now that moderation in collecting local species is recognised as a prudent course, they will find means to enforce its adoption whenever or wherever the occasion arises.

THE PROTECTION OF INSECTS IN DANGER OF EXTERMINATION.

By Robert Adkin, F.E.S.

The task undertaken by the "Committee for the protection of insects in danger of extermination" is of so delicate a nature that one is somewhat diffident in making any comment upon any part of its proceedings, and it must not be thought from what I am about to say that I am not entirely in sympathy with the broad principles of the good work that it has in hand. For my own part, however, I would much rather that the list of species supposed to need special protection had not been published, as I cannot help thinking that the power of the Committee would be much more felt by collectors if its views were pressed home to them in a general way, and the question of the particular species needing such protection left to the good sense and experience of the individual. If, however, such a list was deemed to be a necessity, would it not have been well to have confined it to the narrowest possible limits, and not to have included in it the names of any species whose sporadic appearance tends to show the possibility of their decreased numbers or actual disappearance to be the result of natural causes rather than the act of man? I take it that the scope of the Committee's work would not extend beyond the latter proposition.

Without wishing to enter into any general criticism of the list already published (*ante*, p. 198), many of the species included in which would, I doubt not, appeal for protection from extermination to any thoughtful collector, whether specially indicated or not, I would mention, by way of illustrating my point, two species, my experience of which leads me to believe that their extermination by "over collecting" would be a simple impossibility. In July, 1875, I was at Deal, and shall never forget the abundance of pupæ of *Porthesia chrysorrhœa* that I then met with; the hawthorn hedges in the country lanes, the brambles by the wayside, even the sea-buckthorns on the sand-hills, were full of them; they might be pulled out of the hedges in bunches of half a dozen at a time, and it was no uncommon thing to find three or four spun up in a single bramble-leaf. Had I been so minded, I could literally have collected the proverbial waggon load. Some six years later I again visited the same locality at the same time of year, and should have been glad to have renewed my acquaintance with the species, and in fact made a special journey to the hedges where I had previously found it so abundant, but failed to find it; nor did the sea-buckthorns on the sand-hills prove any more productive, although I was frequently among them for fully a fortnight. About the same time that the species was so abundant at Deal, it was also common in

the Higham district, and apparently disappeared at about the same time as in the former district, although its congener, *Porthesia similis* (*auriflua*) still continued to occur much in the same numbers as formerly. *Clisiocampa castrensis* is another species which, although having a much more restricted range, probably on account of the peculiar situations which it affects and the distribution of its usual food-plant, is also liable to seasons of extreme abundance and scarcity. In the marshes on the north bank of the Thames I have seen the larvæ of this species in all stages in the utmost profusion; yet a few years later a diligent search would not be rewarded by a single example, and such a phenomenon has occurred more than once within my own recollection. It is unnecessary here to discuss the probable causes of the apparently sudden abundance and equally rapid scarcity or disappearance, as that does not come within the present question; but it appears to me that such changes could not possibly have been brought about by any amount of collecting, or indeed by any contingency within man's control. Questions such as these species have raised in my own mind will doubtless occur to the minds of entomologists with regard to some other of the species mentioned in the list, and I fear will not tend to strengthen the hands of the Committee in the task that is before them; but although any attempts to enforce hard and fast rules may lead to unlooked-for difficulties, a vast amount of good may, I doubt not, be done in the desired direction by moral persuasion.

Lewisham, August, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 216.)

Hybernia rupicapraria, *Hb.*—Common in most districts. Of its distribution, however, I have but scanty positive evidence, as its season of flight is so early that it escapes notice in a country which has but few entomological observers. The few localities I give, however, indicate the probability of its being widely spread. Killynon, Westmeath (*Miss R.*); in the North at Belfast (*W.*); abundant near Derry (*C.*); common at Drumreaske and elsewhere in the Co. Monaghan; on the east coast at Castle Bellingham (*Thornhill*), and near Dublin; and it abounds at Clonbrock, Co. Galway (*R. E. D.*).

[Hybernia leucophæaria, *Schiff.*—This insect is recorded in Birchall's list as common, but I have seen no Irish specimen,

though it has been stated to occur at Waterford; of which confirmation is desirable.]

HYBERNIA AURANTIARIA, *Esp.*—Apparently rare. Drumreaske, Monaghan; Favour Royal, Tyrone; Clonbrock, Co. Galway (*R. E. D.*).

HYBERNIA MARGINARIA, *Bork.*—Widely distributed and common in most localities. It varies much in markings. A brown aberration, not so dark as var. *fuscata*, occurs at Mount Bellew, Co. Galway. A very dark bordered form is frequent near Enniskillen and Drumreaske. Clonbrock, common; Leenane, over 1300 ft. above sea-level, Co. Galway; Killynon, Westmeath; Favour Royal, Tyrone, very abundant; Armagh (*J.*); Castle Bellingham (*Thornhill*); Enniskillen; Markree Castle, Sligo, &c.

HYBERNIA DEFOLIARIA, *Clerck.*—Apparently widely spread, but I know little of its distribution in the South of Ireland. Abundant at Killarney, and at Mallow, Co. Cork (*Stawell*); Clonbrock, strongly marked forms (*R. E. D.*), and near Galway (*A.*); Pontoon and Enniscoe, on the shores of Lough Conn, Mayo, abundant; also at Mote Park, Roscommon; Derry, fairly common (*C.*); Glenarm (Brunton, Ent. vii. 43), and Ballycastle, where handsome banded forms occur, Co. Antrim; at Rockabill Lighthouse, three miles off shore, it came to the light; and at Howth suffused ruddy brown specimens occur, and others with strongly marked bands and spotted outer margins; Wooden Bridge, Wicklow (*M. F.*); Enniskillen (*A.*).

ANISOPTERYX ÆSCULARIA, *Schiff.*—Everywhere spread, and often numerous.

CHEIMATOBIA BRUMATA, *L.*—Abundant universally.

CHEIMATOBIA BOREATA, *Hb.*—Clonbrock, numerous (*R. E. D.*); Drumreaske, one pupa taken by Mr. Thornhill.

OPORABIA DILUTATA, *Bork.*—Very numerous everywhere. Handsome banded forms occur at Killarney and elsewhere; also the var. *obscurata*, Staud.

OPORABIA FILIGRAMMARIA, *H. S.*—Limerick (*S.*); Clonbrock (*R. E. D.*), one, Leenane and Aasleagh abundant (*Chapman*, E. M. M. xxv. 213), Co. Galway; Magilligan (*R. C.*), and at Kilderry (*C.*), Co. Derry; Belfast hills (*W.*; see following species).

OPORABIA AUTUMNARIA, *Gn.*—Mr. Watts sent a series of Oporabias from the hills near Belfast to Mr. Barrett for identification, who selected certain small narrow-winged specimens as being similar to the Lancashire and Yorkshire *O. filigrammaria*. Others from wooded slopes at a lower elevation he was of opinion were probably Guenée's *O. autumnaria*.

LARENTIA DIDYMATA, *L.*—Very common and variable. Males from the black basaltic cliffs of Antrim near Ballycastle I have noticed to be extremely dark, though the females are of the normal pale form.

LARENTIA MULTISTRIGARIA, *Haw.*—Very generally distributed throughout Ireland wherever *Galium saxatile* is plentiful. At Howth (where I have taken this species in numbers in the first half of February), and at Clonbrock, &c., the males often show basal and central bands across the fore wing like the female. Co. Dublin and Wicklow; Westmeath, at Cromlyn (*Mrs. B.*), Killynon (*Miss R.*), &c.; Altadiawan, Co. Tyrone; Co. Derry (*C.*); Ballycastle, and the Belfast hills (*W.*). Plentiful in the South of Ireland generally.

LARENTIA CÆSIATA, *Lang.*—Exists throughout the mountain tracts of Ireland, varying much. I have, however, nowhere met with such melanic forms as those from Yorkshire, the grey inconspicuous type chiefly predominating. Like *L. didymata*, I have noticed that in rocky localities the species conforms somewhat to the tone of the rock formation. In the S.E. of Kerry a very unicolorous grey form is found on the slate formation, but on the limestone cliffs of Clare a very pale one.

LARENTIA SALICATA, *Hb.* — Local, but existing in all four provinces. In some places, as at Powerscourt, Wicklow, plentiful in the May emergence. I have (perhaps accidentally) only met with occasional specimens in the late summer. Besides the pale form with well-defined pattern, sometimes showing a well-defined central band, dark at the borders, but pale round the discoidal spot, there is a dark suffused form (var. *unicolorata*, Gregson). The former is frequent at Altadiawan, Co. Tyrone, and on the Belfast hills, where the latter also occurs (*W.*), and at Clonbrock. Galway (*Wallace*), Merlin Park, Clonbrock, Kilcornan (*B.*), Ardrahan (*Miss N.*), &c.; near Crossmolina, Mayo, very common (*S. R. F.*); Markree, Sligo; near Donegal; Magilligan, Co. Derry, suffused with yellow (*Salvage*); Ballycastle, Larne, &c., Co. Antrim (*W.*); Churchill and Armagh (*J.*); Castle Bellingham, Co. Louth (*Thornhill*); Co. Tyrone; Greystones, Arklow, and on the mountain above Powerscourt, Co. Wicklow; Kinsale, Co. Cork.

LARENTIA OLIVATA, *Bork.*—Apparently very local. Glengarriff, Co. Antrim, numerous (*W.*); Buncrana, Co. Donegal, a few (*C.*); Rockwood, Sligo (*R.*); Clonbrock, Co. Galway, one (*R. E. D.*); Knock Ion, Westmeath, abundant (*Miss R.*); Powerscourt, Co. Wicklow (*C. G. B.*); Bandon, Co. Cork (*L.*).

LARENTIA VIRIDARIA, *Fb.*—Generally distributed and plentiful.

EMMELESIA AFFINITATA, *St.*—Local and not numerous. I have

an aberration from Altadiawan, Co. Tyrone, in which the whitish sinuate band of the fore wings is of a ferruginous tint near the costa, but becomes obsolete toward the inner margin. A smoky form with obsolete band (ab. *unicolorata*, Gregson) occurs at Magilligan, Co. Derry (*R. C.*). Farnham, Co. Cavan; Favour Royal, Co. Tyrone; Cookesborough, Co. Westmeath; Hollybrook, near Boyle (*Miss ff.*); Inishowen (*W. E. H.*) and Drumawen (*G. V. H.*), Co. Donegal; Sligo (*R.*); Dalyston and Clonbrock, Co. Galway.

Emmelesia alchemillata, *L.*—Local like the preceding, but sometimes abundant. Killynon, Westmeath (*Miss R.*); Favour Royal, Co. Tyrone; Tempo Manor near Enniskillen, abundant (*Langham*); Athlone (*Wilcox*), Clonbrock, Dalyston, and Recess, Co. Galway; Ballycastle, Co. Antrim; Derry, abundant (*C.*); Ardara (*J.*), and Inishowen, Co. Donegal; Sligo (*R.*), abundant; Bryansford, Mourne Mountains (*W.*); Clogher Head, Co. Louth; Killarney.

Emmelesia albulata, *Schiff.*—Abundant throughout Ireland wherever the food-plant flourishes; varying from an almost unicolorous greyish white form (var. *griseata*) to strongly banded ones with varied tones of grey ground. This is one of the Geometers which come to sugar.

Emmelesia decolorata, *Hb.*—Very local. I have never taken any Irish examples. Near Belvoir Park, Belfast (*Bw.*); Magilligan, Co. Derry, a very rich form (*R. C.*); Torc, Killarney.

Emmelesia tæniata, *St.*—This interesting local species has, I believe, a much more wide distribution than is indicated by our present information. It is likely to turn up in most districts in which relics of old forest survive. Numerous in a few places like Killarney, but notoriously difficult to procure in fair condition. It varies much in size, suggesting difficulty in procuring a regular food supply, or contingent on larval hybernation. It frequents hedges or foliage on the sunny side of woods or open glades, whence it can be beaten on hot days. The median band of the fore wing varies in breadth, sometimes being narrow and very dark, with the elbowed line only slightly angulated near the costa. A curious specimen was taken by Mr. Watts in Donard demesne, Mourne Mountains, Co. Down. Of large size, with uniform buff ground colour, like that of *Anticlea badiata*, all over the fore wing, traversed by a narrow dark central band, the edges of which were not defined with the usual pale strigæ. Beside the above localities, it occurs not infrequently at Favour Royal and Altadiawan, Co. Tyrone; Rockwood, Sligo; and Belvoir Park, Belfast (*Bw.*).

Emmelesia unifasciata, *Haw.* — Kingstown (*Greene*), and

Howth (*G. V. H.*), Co. Dublin; Castle Bellingham, Co. Louth, occasional (*Thornhill*); Derry (*C.*).

EMMELESIA MINORATA, *Tr.* — Mourne Mountains, very local (*B.*); Clonbrock, Co. Galway, four specimens (*R. E. D.*).

EMMELESIA ADÆQUATA, *Bork.* — Widely spread throughout Kerry and Galway. Glengariff, Kenmare, Cloonee L., and Killarney, Kerry; Kilcornan (*B.*), Ballinahinch, Kylemore, Aasleagh, Ardrahan, and Roundstone (*Lt. Walker*), Co. Galway.

EUPITHECIA VENOSATA, *Fb.*—Generally distributed; very common at Howth, where a very light form prevails. At Clonbrock, Mr. Dillon has met with a darkish form. At Glandore, Co. Cork, Mr. C. Donovan took numerous specimens of the smoky form similar to those from the Orkneys and Shetland, but devoid of whitish lines; and from a larva taken near Ardrahan, Co. Galway, I bred a blackish brown unicolorous specimen without any reticulated pattern, except on the costa. These melanic variations of *E. venosata* therefore do not appear to be connected with insular segregation, but to be local varieties.

[EUPITHECIA LINARIATA, *Fb.* — Birchall reported a specimen from Howth, but as the food-plant is not indigenous there, though common in districts in the South of Ireland, it may perhaps have been a small specimen of *E. pulchellata.*]

EUPITHECIA PULCHELLATA, *St.*—In many parts of Ireland, and sometimes emerges in autumn, but is disappointing to breed owing to the large proportion of larvæ stung by ichneumons. Kingstown (*Greene*), Howth? (*B.*), Co. Dublin; Castletownsend, and Cork (*S.*); near Ardtully and Killarney Upper Lake, Co. Kerry; Clonbrock, Co. Galway (*R. E. D.*); Knocknarea, Sligo (*Russ*); Cloghan near Stranolar, Co. Donegal, abundant; near Derry (*C.*); Altadiawan, Co. Tyrone; Errigal, Co. Monaghan; Tempo Manor, Enniskillen (*Langham*).

EUPITHECIA OBLONGATA, *Thnb.*—Widely spread and common. The ground colour of some specimens is slightly yellowish.

EUPITHECIA SUCCENTAUREATA, *L.* — Decidedly local, and restricted to narrow bounds, and somewhat scarce where found. Howth (*B.*), near the coastguard station on Lambay Island I have found it in some numbers, Co. Dublin; Castle Bellingham, Co. Louth (*Thornhill*), scarce; Armagh (*J.*).

EUPITHECIA SUBFULVATA, *Haw.*—Mr. Birchall seems to have met with it in many localities. I know it only from the east coast, at Arklow, Co. Wicklow; near Dublin and Balbriggan; Clogher Head and Castle Bellingham, Co. Louth.

EUPITHECIA SCABIOSATA, *Bork.* — Apparently a local insect, sometimes pretty numerous. Widely spread throughout the

county of Galway, and probably in similar districts of Clare. All the specimens I have seen from Galway are of the pale type, with washed-out pattern. "Taken near Galway in June in some numbers in corners of rough pasture fields in mixed herbage" (*Birchall*, Entom. iii. 192); also by Mr. Allen. Kilcornan, common (*B.*), Ardrahan, common, Kylemore (*Hon. Emily Lawless*), Co. Galway; the Rev. Joseph Greene found the pupæ at Rathfarnham, Co. Dublin; Killynon, Co. Westmeath; Enniskillen (*Partridge*); Knocknarea, Sligo (*Russ*).

Eupithecia plumbeolata, *Haw.*—Local. Killarney, common (*B.*), near Kenmare; Pontoon, near Foxford, Co. Mayo; not common.

Eupithecia isogrammata, *H.-S.*—Moycullen, Co. Galway; Knocknarea, Sligo (*Russ*); Favour Royal, Tyrone (*M.F.*); Castle Bellingham (*Thornhill*).

Eupithecia pygmæata, *Hb.*—Rare and local. "Co. Wicklow; Portmarnock, Co. Dublin; and Kilcornan, Co. Galway" (*B.*). I took a very fresh specimen, showing a purplish sheen on the wings, beside the river at Castle Bellingham, in company with Mr. Thornhill.

Eupithecia helveticaria var. arceuthata, *Frr.*—In Entom. iii. 192, Birchall mentions having captured at Killarney a single example, which was referred to this species by Harpur Crewe. It would be very desirable to learn in what cabinet this specimen is preserved.

(To be continued.)

NOTES ON THE GENUS *SIGARA*, Fabr. (RHYNCHOTA).

By G. W. Kirkaldy.

1. Sigara ovivora (Westw.).
Corixa ovivora, Westw., Proc. Ent. Soc. Lond. 1871, p. iv.

Through the kindness of Prof. Poulton, I have been able to examine the two types (male and female) of this species. Unfortunately both are (after the custom of a quarter of a century ago, and, it is to be regretted, sometimes at the present day) glued down on one entire surface on to the card (male venter downwards, female venter upwards); and, having regard to their poor condition, I have deemed it too risky to attempt a very complete examination. The following notes will, however, be perhaps some increase to our knowledge of the species and genus.

It is not a *Corixa*, but a *Sigara*, and allied to *S. minutissima (Linn.)*; the width of the head at the base is greater than that

of either of the eyes (as seen from above), and is about equal to the width of the vertex,* the interior lateral ocular margins being curved outwards from their base, and inwards again towards their apparent apical margin (as viewed from above). Looking at the face (*i.e.* the reflexed part of the head anterior to the "vertex," and posterior to the clypeus), the eyes appear subtriangular, the interior margins being subparallel to one another, the bases continuous with that part of the head, the exterior margins diverging curvedly from the capital lateral margins, and forming third sides subequal to the interior ocular margins; apex rounded. The length of the eyes (still viewing the face only) is about equal to the length of the head from the apices of the eyes to the apical margin of the clypeus. The base of the head is somewhat as in *S. minutissima* (Linn.); from the centre of the base the two halves curve downwards at an obtuse angle to one another. Head sordid testaceous; eyes dark purple-brown; pronotum light olive-brown (lateral and posterior margins rather broadly sordid luteous), transverse, about twice as wide as long, produced laterally beyond the ocular lateral margins; basal and apical margins very convex, the latter laterally sinuate; lateral margins very short, slightly diverging posteriorly, about one-seventh (roughly) of the middle breadth of the pronotum. The scutellum is olive-brown, and appears to be divided by a suture into two portions; I am not, however, acquainted with this structure in any other *Sigara*, and it may be due to bad preservation and shrinkage; across the centre of the posterior half of the scutellum is a short transverse dark stripe; also "metasterno profunde bisinuato, angulis posticis lateralibus elongatis" (Westw.). Pedes testaceous [I regret I can give no account of the palæ]; intermediate femora about equal to tibiæ and tarsi together; unguiculi rather longer than tibiæ, tarsi rather longer than unguiculi, and nearly twice as long as tibiæ. Hemielytra light olive-brown, obscurely spotted with brown [there appear to be three longitudinal stripes], superficially punctured, and sparsely furnished with short yellow hairs. Dorsum of abdomen olive-brown, paler at the margins; connexivum sordid testaceous. Entire ventral surface testaceous.

I have not been able to detect a strigil in this species, but the insect is so minute that the structure of this would be scarcely visible with a $\frac{1}{4}$-in. objective, and the broken and irregular male abdominal segments render the examination of an old and dry

* As explained in Ann. Mag. Nat. Hist. (6), xx. p. 60 (1897), I use "vertex" for the *apparent* apical margin of the head (as seen from above, when the insect is lying flat, venter downwards); this margin is therefore really more or less imaginary. Nevertheless it is extremely useful as a diagnostic character in the Notonectidæ and Corixidæ, to which families its use will be almost entirely restricted—in the sense indicated above.

specimen a grave risk for its safety. L. 2·8 mm.; lat. hum. circ. 1·6 mm.

Canara R. (India). Types, male and female, Hope Mus. Oxon.; another specimen in the same museum from Ceylon (Thwaites, 1872), I refer to this species.

2. SIGARA SIVA, nom. nov., for

Sigara striata, Fieb., Abh. k. böhm. Ges. Wiss. (v.), 3, p. 292, Taf. 1, f. 22–4, 1844.

Preoccupied by Fabricius, Ent. Syst. iv. p. 60, 1794 [which equals *Corixa geoffroyi*, Leach—typum vidi].

3. SIGARA M-NOTATA, nom. nov., for

Sigara lineata, Fieb. *l.c.*, 293, Taf. 1, ff. 20 and 25, preocc. Fab., *l.c.*, p. 59.

4. The description of *Corixa albifrons*, Motsch., Bull. Moscou xxxvi. pt. 2, p. 94 (1863), is clearly that of a *Sigara*, but the too few structural characters given do not agree with any species known to me. In the absence of the type, or of specimens entirely agreeing with the description, the species must, for the present at least, remain doubtful.

Six *Sigaræ* have been now described from the Oriental region, viz. *albifrons* (Motsch.), *grisea*, Fieb., *m-notata* (=*lineata*, Fieb.), *ovivora* (Westw.), *punctata*, Fieb., and *siva* (= *striata*, Fieb.). These doubtless require revision. On the other hand, we cannot doubt but that an increase of interest in these small bugs will result in very many more being made known; and I take this opportunity of asking for material (Oriental or otherwise) in two of the aquatic families of Rhynchota—Corixidæ and Notonectidæ.

Summary.

1. *Corixa ovivora*, Westw., is a *Sigara*.
2. *Sigara siva*, nom. nov. for *striata*, Fieb. (nec. Fab.).
3. *S. m-notata*, nom. nov. for *lineata*, Fieb. (nec. Fab.).
4. *Corixa albifrons*, Motsch., is a *Sigara* ——? sp.

BUTTERFLY HUNTING IN THE HIMALAYAS.

By W. HARCOURT-BATH.

To one only accustomed to collecting in Europe, the Himalayas constitute a wonderfully exciting field for research and exploration, especially to the student of entomology. The region in which I am travelling at the present time, namely, the eastern portion of this vast chain, is without doubt the richest of any for

its extent in the Eastern Hemisphere. Within a radius of about fifty miles of my headquarters there are found as many as six hundred different species of butterflies, in addition to a large number of seasonal, climatal, and geographical varieties; while moths and beetles and other insects may be encountered in thousands. This is not only the case as regards the number of species, but individuals of many of them occur in the greatest profusion. The abundance of large and handsome butterflies in the tropical valleys is a sight not to be forgotten.

Up to an altitude of about 5000 ft. we get species characteristic of the Malay region, which is noted for its excessive richness in other branches of natural history, besides in entomology. It is here that one see the great Papilios in all their glory, as well as many large species of Danaidæ, &c. What a grand sight it is to view the gigantic *Ornithoptera pompeus*, or equally handsome *O. rhadamanthus*, sailing majestically through the forest glade, or the green and red-spotted *Papilio paris* and *P. ganesa* dashing about in the broiling sunshine, in company with many other beautiful species of the same genus; while the various species of *Euplœa*, with iridescent colours which change with every flap of their wings, occur in countless swarms within the shade of the luxuriant arborescent vegetation. Pre-eminently plentiful among these are *E. rogenhoferi*, *E. rhadamanthus*, and *E. core*. Several species of *Neptis*, noted for their graceful sailing flight, are also exceedingly plentiful in this zone, as is likewise the case with many species of Pieridæ, the commonest of all being *Ixias birdi*, a beautiful yellow orange-tipped form, which occurs in company with half a dozen pretty species of *Delias*.

The temperate zone, which rises above the preceding to the height of 10,000 or 12,000 ft., has an entomological fauna allied to that which occurs in the Manchurian Subregion of the Palæarctic Area of zoo-geographers, and is exceedingly like the European in its general facies, although a considerable proportion of subtropical forms are intermingled with it. At this altitude one encounters species closely allied to many which are among our most familiar butterflies in England, such as *Pieris brassicæ*, *P. rapæ*, *P. napi*, *Lycæna argiolus*, *Vanessa atalanta*, *V. urticæ*, &c., which are here represented by geographical forms, considered sufficiently distinct to be treated as separate species; while others are absolutely identical, such as *Vanessa cardui* and *Argynnis latonia*, which are both common insects at this elevation in the Eastern Himalayas.

At the altitude of 12,000 ft. and upwards the alpine and arctic entomological fauna of Thibet is met with, characterised by its several species of *Parnassius*, which produce such a typical feature in the scenery of the Alps.

Quite in harmony with the condition of things here explained, the scenery is of the grandest description imaginable. Mountain

after mountain up to an altitude of 10,000 or 12,000 ft. is clothed with a dense forest of luxuriant vegetation embracing all the phanerogamic zones upon the earth, while above the whole tower the great snow peaks 20,000 to 29,000 ft. in height. An array of these giants stretches away as far as the eye can reach in a line 150 miles in length, presenting without doubt the most magnificent, imposing, and awe-inspiring spectacle of the kind in the world.

I must, however, hasten to close this brief epistle, for it is time to be up and doing once again. The sun is already shining on the topmost peaks of Everest, Kinchinjanga and Co., and the elegant *Teinopalpus imperialis* will shortly be flitting around the bushes of *Daphne nepalensis* now bursting into bloom in the elevated forests of Ghoomphar, Rungaroon, and Sonada. The needful apparatus being ready, the order to start is given, and I am off once more to be among the handsome insects which constitute the primary object of the present expedition.

BRITISH HYDROCAMPINÆ AND SCOPARIANÆ.

In Part II. of the 'Transactions of the Entomological Society of London,' published in July last, there is a paper by Sir George F. Hampson "On the Classification of two Subfamilies of Moths of the Family Pyralidæ: the Hydrocampinæ and Scoparianæ."

The British species referred to these two groups were placed by Meyrick in his Pyraustidæ, and are as follows:—

1. *Eurrhypara urticalis*, Linn., Meyrick.
2. *Botys hyalinalis*, Hübn. (*Psamotis hyalinalis*, Meyrick).
3. *Psamotis pulveralis*, Hübn., Meyrick.
4. *Perinephele lancealis*, Schiff., Meyrick.
5. *Stenia punctalis*, Schiff., Meyrick.
6. *Cataclysta lemnata*, Linn., Meyrick.
7. *Paraponyx stratiotata*, Linn. (*Nymphula stratiotata*, Meyrick).
8. *Hydrocampa nymphæata*, Linn., Meyrick.
9. *Hydrocampa stagnata*, Don. (*Nymphula stagnata*, Meyrick).
10. *Scoparia* (12 species).

In the system under consideration *Hydrocampa*, Latr., and *Paraponyx*, Hübn., are merged in *Nymphula*, Schrank, which is the fifth genus of the forty-nine genera referred to the Hydrocampinæ, and has fifty-three species assigned to it. Of these, *stagnata* is No. 2; *nymphæata* No. 3, and type of the genus; *stratiotata* No. 26.

Cataclysta, Hübn., is the seventh genus, with *lemnata*, its

type, occupying fifth place among the forty-eight species comprised in it.

Stenia, Guen., with eleven species, ranks as the thirty-eighth genus; *punctalis*, the type, is placed third in order of species.

Psamotis, Hübn., which includes *Perinephele*, has only three known species, *i.e. lancealis*, *pulveralis* (type), and *hyalinalis*. It is the forty-sixth genus, and is immediately followed by *Eurrhypara*, Hübn., of which *urticalis* is the only known representative.

The Scoparianæ are a compact little group of seven genera, but only the typical one—*Scoparia*—is European. This genus, which occupies sixth place in the arrangement, is divided into two sections; the first comprising one hundred and thirty-two species, and the second only one; *S. cembræ* is the type.

In the subjoined list of species found in Britain the number in brackets indicates the position of the species in the genus. It will be seen that *basistrigalis*, *atomalis*, *ulmella*, and *conspicualis* are sunk in *ambigualis*; *scotica* is removed from *zelleri*, which is not now considered to be a British species, and is placed with *cembræ*; *frequentella*, Staint., is employed for the species hitherto referred to as *mercuriella*, Linn., and *portlandica* is given as a synonym of it instead of *phœoleuca*, Zell., which is deposed, or rather relegated, together with *vesuntialis*, Gn., to a list of unplaced species; *gracilalis* becomes a synonym of *alpina*. *Ingratella*, Zell., which is a South European species, possibly ought never to have been included in the British list.

It will probably be admitted that this revision of British *Scoparia*, which agrees with that of Mr. Meyrick except as regards the sequence of species, is in accordance with our present knowledge. There is, however, one species for which a claim to specific rank may be urged, *i.e. basistrigalis*. Although I cannot myself see that it differs in any essential character from *S. ambigualis*, I am well aware that several able entomologists consider it to be quite distinct from that species.

R. S.

SYNONYMY OF THE BRITISH SPECIES OF *SCOPARIA*.
(Abstracted from Trans. Ent. Soc. Lond. 1897, pp. 234–236).

Genus SCOPARIA, 133 species. Type *S. cembræ*.

(90). SCOPARIA AMBIGUALIS, Tr., Schmett. Eur. vii. p. 184.
Eudorea mercurella, Lah. Pyr. No. 76.
E. conicella, Lah. Pyr. No. 76*b*.
E. ancipitella, Lah. Pyr. No. 86.
E. basistrigalis, Knaggs, E. M. M. iii. p. 1 (var.).
E. octavianella, Mann. W. E. M. 1859, p. 164 (var.).
Scoparia atomalis, Doubl. List (var.).
Eudorea ulmella, Knaggs, E. M. M. iii. p. 217.
E. conspicualis, Hodgk. E. M. M. xviii. p. 134.

Scoparia signella, Teich. Arb. Ver. Riga vi. p. 72.
S. tæniatella, Teich. Arb. Ver. Riga v. p. 73.
S. incertalis, Dup. Lep. Fr. viii. p. 286, pl. 229, fig. 4.

(91). SCOPARIA DUBITALIS, Hübn. Pyr. p. 49.
Tinea pyralella, Hübn. Tin. fig. 167.

(94). SCOPARIA CEMBRÆ, Haw. Lep. Brit. p. 498.
Eudorea cembrella, Steph. Ill. iv. p. 299.
E. subfusca, Steph. *l.c.*
E. asphodeliella, Lah. Pyr. No. 74.
Scoparia erralis, Guen. Delt. and Pyr. p. 421.
S. scotica, White.

(95). SCOPARIA PALLIDA, Steph. Ill. iv. p. 300.
Eudorea ærtzeniella, H. S. iv. p. 49, fig. 97.

(100). SCOPARIA TRUNCICOLELLA, Stn. Man. ii. p. 161.
Eudorea murcurella, Zell. L. E. i. p. 293.

(101). SCOPARIA CRATÆGELLA, Hübn. Tin. fig. 231.

(102). SCOPARIA FREQUENTELLA, Stn. Man. ii. p. 162.
Eudorea portlandica, Dale E. M. M. xxi. p. 275.

(103). SCOPARIA MURANA, Curt. B. E. iv. p. 170.
Scoparia tuoniana, Hoffm. Stett. Ent. Zeit. 1893, p. 130.

(106). SCOPARIA ALPINA, Stn. Man. ii. p. 163.
Eudorea gracilalis, Dbl. Stn. Man. ii. p. 163.

(108). SCOPARIA ANGUSTEA, Steph. Ill. iv. p. 302.
Eudorea coarctata, Zell. L. E. i. p. 308.
Scoparia amissella, Mill. Icon. i. p. 401, pl. L., fig. 1.

(112). SCOPARIA LINEOLA, Curt. B. E. iv. p. 170.

(113). SCOPARIA RESINEA, Haw. Lep. Brit. p. 499.
Eudorea vaudaliella, H. S. vi. p. 143, fig. 157.
Scoparia resinea v. *orientalis*, Alph. Troudy. Ent. Ross. x. p. 26.

THE ASIATIC DISTRIBUTION OF BRITISH GEOMETRIDÆ.

THE following list is compiled from a comprehensive paper on "Geometridæ from China, Japan, and Corea," by Mr. J. H. Leech, recently published in vols. xix. and xx. of the 'Annals and Magazine of Natural History.'

The number of species belonging to this family recorded from the region dealt with is nearly nine hundred. A great many of these are European species, nearly the whole of which are found in Britain.

Mr. Leech's arrangement, which is based chiefly on the system of classification employed by Sir George Hampson in his 'Moths of India,' has been followed as regards subfamilies and the sequence of genera; but where the generic name adopted by Mr. Leech is different to that used in the Entom. Syn. List, the

former is placed in brackets. The position of the species in in Mr. Meyrick's "Revision of the European Geometridæ" (Trans. Ent. Soc. Lond. 1892) is also indicated.

URAPTERYX SAMBUCARIA, Linn.

Occurs in Amurland, Japan, and Western China.

Most Eastern Asian specimens are referable to var. *persica*, Mén., which is whiter than the type; but the type also occurs at Omei-shan and Pu-tsu-fong, in Western China.

BAPTA BIMACULATA, Fb. = *subnotata*, Warren.
Pseudopanthera bimaculata, Meyr.

Mr. Leech has specimens from Japan, Yesso, and Corea.

BAPTA PUNCTATA, Fb. = *temerata*, Hb.
Asthena sancta, Butl.
Pseudopanthera punctata, Meyr.

Occurs in Amurland, Japan, and Yesso.

Some specimens from the mainland of Japan are typical; others are suffused with greyish, and the markings are more or less obliterated. Mr. Leech states that he has examples from Germany which are somewhat similar to the suffused form.

ANGERONA PRUNARIA, L.
Euchlæna prunaria, Meyr.

Occurs in Amurland, Corea, Japan, and Yesso.

"Most of the European forms are represented in Japan, but there is a wider range in the size of the specimens, the smallest example being only 36 millim., whilst the largest measures 74 millim."

NUMERIA PULVERARIA, Linn. = *japonica*, Butl.
Metrocampa pulveraria, Meyr.

Recorded from Amurland, Japan, Kiushiu, and Corea.

Mr. Leech notes that "the specimens from Gensan and Kiushiu are very small."

SELENIA TETRALUNARIA, Hufn.=*illustraria*, Hb.

The typical form was obtained at Hakodate, in Yesso, in the month of June, and the var. *æstiva* in August.

Appears not to have been observed in any other East Asian locality.

PERICALLIA SYRINGARIA, Linn.
Hygrochroa syringaria, Meyr.

Mr. Leech is of opinion that *P.* (*H.*) *distans*, Warr., may possibly be an Asiatic form of this species, and he further considers that *P. parva*, Hedem., from Amurland, may be identical with *P. distans*.

EPIONE (CEPPHIS) ADVENARIA, Hb.

Occurs in Amurland, Japan, Yesso, and Corea. The specimens are typical.

HIMERA (COLOTOIS) PENNARIA, Dup.

Specimens from Amurland and Japan are of the typical form.

ENNOMOS AUTUMNARIA, Wernb. = *alniaria*, Esp.

Specimens from Amurland, Japan, and Yesso agree with those from Europe.

EURYMENE DOLABRARIA, Linn.
Metrocampa dolabraria, Meyr.

Only record from Yesso. Typical.

LOZOGRAMMA PETRARIA, Hb.
Pseudopanthera petraria, Meyr.

The specimens from Japan, Yesso, Central and Western China, are of the normal form. The species also occurs in Amurland.

MACARIA ALTERNATA, Hb.
Opisthograptis alternaria, Meyr.

Recorded from Amurland. Mr. Leech believes that *M. shanghaisaria*, Walk., which is found in North China, Japan, and Yesso, as well as in Amurland, may be a local form of *M. alternata*.

STRENIA CLATHRATA, Linn.
Opisthograptis clathrata, Meyr.

Specimens from Amurland, Japan, and Yesso do not differ from European.

HALIA (TEPHRINA) BRUNNEATA, Thnb.
Diastictis brunneata, Meyr.

Occurs of the typical form in Amurland and Japan.

CABERA (DILINIA) EXANTHEMATA, Scop.

Typical in Amurland and Yesso.

A closely allied species, *C.* (*D.*) *schæfferi*, Brem., occurs in Corea and Western China, as well as in Amurland.

HYBERNIA LEUCOPHÆARIA, Schiff. = *dira*, Butl.

Some of the Japanese examples are of large size (*dira*, Butl.), but in other respects they do not differ from European specimens. One form, var. *nigrilinearia*, Leech, is of a pale ochreous grey colour, with the second transverse line "deeply indented below the middle, and the space between this line and the curved basal line is thickly sprinkled with blackish scales, forming a dark median fascia, in the central portion of which is placed a pale oval patch; median nervure conspicuously black; before the apex is a blackish, oblique, abbreviated fascia."

This species is only recorded from Japan.

PHIGALIA PEDARIA, Fb.

Apocheima pedaria, Meyr.

This species is represented in Japan by *P. sinuosaria*, Leech, a species new to science.

(To be continued.)

NOTES AND OBSERVATIONS.

PAIRING OF SPILOSOMA FULIGINOSA WITH ARCTIA CAIA. — The male was a dark specimen of *S. fuliginosa* bred from some Scotch ova. I have kept both these moths in the same cage before without experiencing so curious a result. Considering *A. caia* was a female proportionately large, and had only a few days previously deposited some ova, it strikes me this is worthy of publication, as at the time of assembling there were some five or six females, newly out, of *A. fuliginosa*. July 20th, I removed the pair to a jar, when a day later the female again laid over fifty more eggs, which I hope will prove fertile. —H. W. BELL-MARLEY; Ravenscourt Park, W.

SETINA IRRORELLA ON THE COTSWOLDS.—Mr. George Harding (Ent. Mo. Mag., August) records the occurrence of *S. irrorella* on the Cotswold Hills in Gloucestershire. He states that "for many years a specimen or two has occurred now and then at one or two localities at a high elevation" on these hills; this year, however, he secured a fine series. Mr. Harding has been good enough to send me a pair of these Gloucestershire insects, which he believes to be a form intermediate between *S. irrorella* and *S. aurita*. Until the matter was thus introduced, I had not considered the question of the specific identity of these two insects, but after a careful examination of the series of each in Mr. Leech's collection, I do not dispute the possibility of *aurita* being an alpine form of *irrorella;* but I can hardly endorse the opinion that these Gloucestershire examples are to be regarded as links connecting *irrorella* with *aurita*. The male specimen sent me is deeper in colour than most of my Box Hill examples, but is identical in this respect with one from Folkestone; the female is certainly of a richer coloration than any other example of this sex in my collection. —RICHARD SOUTH; 100, Ritherdon Road, Upper Tooting, S.W.

CAPTURES AND FIELD REPORTS.

CHŒROCAMPA ELPENOR IN SUFFOLK.—During the last fortnight I have found twenty-four larvæ of *C. elpenor* on the banks of the Stour. They were nearly all feeding on willow-herb.—(Miss) M. WILSON; Cavendish Rectory, Suffolk, Aug. 22nd, 1897.

ACHERONTIA ATROPOS IN SUFFOLK.—I have a fine chrysalis of *A. atropos* which was obtained here in the larva state about three weeks ago. Several other specimens were seen in a potato-field.—(Miss) M. WILSON; Cavendish Rectory, Suffolk, Aug. 22nd, 1897.

COLIAS EDUSA IN OXFORDSHIRE.—On Aug. 9th I caught, in a field near Charlbury, Oxfordshire, a fine female *C. edusa*. Is it not very unusual to find them so far inland?—GWENDALINE MATHEW; Sandford Mount, Charlbury, Aug. 20th, 1897.

[Although it is not altogether unusual for this species to be observed in our inland counties, especially in what are known as "*edusa* years"—that is, years when the species is plentiful—its occurrence in Oxfordshire this year is an interesting fact to record.—ED.]

LYCÆNA ARGIOLUS IN CHISWICK.—I am glad to state that this handsome little butterfly has by no means been an uncommon visitor this season. It was Easter Day when first my attention was called to its appearance; this was in Hammersmith. Only on the same morning, in Chiswick Lane, was I able to testify to the fact that they were distributed, flying, then settling on the ground. This was the first brood, according to Mr. W. F. Kirby. I saw no more until to-day (Aug. 1st), when in the same lane there were about five, settling as before on the ground; one I caught as it was drinking from a puddle.—H. W. BELL-MARLEY; Ravenscourt Park, W.

CICINDELA GERMANICA IN DORSET. — Mr. Pickard-Cambridge will doubtless be glad to know that this local beetle is still to be found in the locality recorded by him (between Bridport and Lyme Regis) in 1888 (Entom. xxii. 214). On July 18th I took forty examples in the course of half an hour, and might easily have obtained twice the number. It appeared to be confined to one damp place, but was plentiful in that spot, some four or five specimens being often seen at the same moment running swiftly among the scanty herbage and over the loose earth. There is, I think, small fear of its being exterminated for many years. — F. W. LAMBERT; 70, St. Giles, Oxford.

CALLIMORPHA HERA.—On Aug. 18th I took in my garden at Alphington, near Exeter, at 8.30 in the morning, a fine female specimen of *C. hera*; hind wings orange, inclining to red. The moth was flying in the sunlight, and had settled on the head of an aster flower.—(Rev.) ALBERT BONUS.

[The first capture of this species in South Devon was at Alphington about twenty-eight years ago.—ED.]

ENTOMOLOGY IN MERIONETHSHIRE.—During a stay at Barmouth from July 10th to 24th, I chiefly occupied myself in collecting and observing the insects of the surrounding country. The following is a complete list of the insects which came under notice; when no locality is specially mentioned, Barmouth is intended:—

Lepidoptera: *Pieris brassicæ*, *rapæ*, and *napi*. All common.—*Epinephele* (*Hipparchia*) *ianira*. Very common; many of the females were unusually large and bright, and the ocelli on the under side were especially finely developed.—*E.* (*H.*) *tithonus*. Not common.—*E.* (*H.*) *hyperanthus*. Varies considerably in the ground colour of the under side, and in the number and development of the ocelli; not met with at Barmouth, but common at Tan-y-bwlch.—*Satyrus* (*H.*) *semele*. In perfect condition at Barmouth; much darker than those which I have taken on limestone in other parts of Wales. The rock here is a dark slate, so the intensity of colour is probably for protective purposes. — *Cœnonympha pamphilus*, *Pararge* (*Lasiommata*) *egeria*. Scarce.—*P.* (*L.*) *megæra*, *Argynnis paphia*. *Woods about* Barmouth, Tan-y-bwlch, and Dolgelly, but not plentiful.—

A. aglaia and *adippe*. Both very common at Barmouth and Tan-y-bwlch, and in all the large woods and openings up the Vale of Festiniog.—*A. selene*. Several much worn examples of the first brood met with (very late to linger on the wing) at Barmouth and Tan-y-bwlch.—*Vanessa urticæ, V. (Cynthia) atalanta, Thecla rubi*. Just beginning to appear at Barmouth.—*Lycæna icarus, Chrysophanus phlæas, Hesperia sylvanus*. Worn.—*Macroglossa stellatarum*. At flower of valerian, which grows in profusion at Barmouth. — *Zygæna filipendulæ*. Very generally distributed; larvæ swarmed on almost every flower-head of ragwort.—*Euchelia jacobææ, Hepialus sylvanus, Bombyx rubi, B. quercus, Saturnia carpini*. Larvæ of all three on the heather-covered mountains at Barmouth.—*Thyatira derasa*. At sugar on Barmouth sand-hills.—*Bryophila perla*. At sugar and valerian blossom.—*Leucania conigera*. Common at valerian; varies considerably in depth of colour.—*L. lithargyria*. Both at sugar and valerian.—*Xylophasia lithoxylea*. Swarms at valerian.—*X. polyodon*. A pest, especially at sugar.—*Mamestra brassicæ. M. albicolon*. At sugar on sand-hills and valerian.—*Caradrina cubucularis, Agrotis exclamationis, A. corticea, A. cursoria, A. tritici*, and *A. ravida*. All at flowers of valerian. The *A. exclamationis* all bore a reddish tinge; only one specimen of *A. ravida* was met with. *Triphæna pronuba, T. orbona, Abrostola tripartita*. Barmouth, one.—*Plusia gamma*. Met with wherever I went; all much worn.—*Boarmia rhomboidaria*. Some remarkably pale forms.—*Geometra vernaria*. Rather generally distributed around Barmouth.—*Acidalia marginepunctata*. At valerian.—*A. aversata, Cabera exanthemata, Halia wavaria*. Valerian, scarce.—*Ematurga atomaria, Camptogramma bilineata*. Very variable; two taken without hardly a trace of marking, also several with a blackish tinge.—*Eubolia palumbaria*. Everywhere among heather.—*Anaitis plagiata*. Barmouth; was almost over. — *Tanagra atrata*. — AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, July 30th.

NOTES FROM CARLISLE.—So far this season seems to be the record one here both for scarcity of larvæ and imagines, especially Noctuæ. Butterflies have been fairly well represented, but this is a poor district for Diurni when compared with some of the southern counties. However, the species that do occur with us were pretty plentiful. *Lycæna minima* was very common, as also were both larvæ and imagines of *Melitæa aurinia*. *Cœnonympha typhon* was also very abundant, especially on Bowness Moss, which I visited on July 1st, when, although the day was anything but an ideal one for collecting, I found this butterfly swarming. Owing to the strong winds which had been prevailing for a considerable time previously, a large number of the specimens I got in the net I released again owing to their damaged condition; large pieces being broken out of their wings, although they were not rubbed in the least. I got a good quantity of ova from some I took, most of which hatched, even after having been subjected to ammonia as they were sticking to the edges of the pill-boxes. The young larvæ, however, have a very sickly appearance and are dying fast. I went to Silloth for *Satyrus semele* on July 19th and found it very plentiful. I was much surprised to have my attention called to a male *semele* and a female *atalanta* in cop. on a stem of grass; I did not disturb them. Is not this rather unusual? With regard to sugar, I may say that I have been out over a dozen times and have had only two nights worth mentioning. Mr. Day, Mr. Wilkinson, and I journeyed to Bolton Fell, which, by the way, means a walk of something like twenty-six miles, on June 26th. We

did extremely well at sugar, our take being both numerous and variable, although principally common things, the best of which were *Agrotis strigula* (*porphyrea*), *Acronycta menyanthidis*, *Macaria liturata*, &c. I and a friend walked to the same place on July 17th, a much more promising night for sugar than June 26th, but we only obtained two moths, one *Triphæna pronuba* and one *Xylophasia polyodon*. However, we have one consolation—things *may* improve, but they cannot get worse.—J. E. THWAYTES; 8, Clement Place, Boundary Road, Carlisle, July 23rd, 1897.

NOTES ON THE SEASON; CHESTER DISTRICT.—January was a severe though changeable month with us—a mixture of frost, thaw, and snow, and I saw no insects. But by February 14th the gardens were gay with crocuses, and *Hybernia rupicapraria* was to be seen, commonly enough, at rest on the gas lamps. It was the 20th of March before I paid my first visit of the season to Delamere Forest, and then it was too late for such things as *H. leucophæaria* and *Anisopteryx æscularia*, excluding, of course, occasional late specimens. Matters to me of greater interest were: (1) Hybernated larvæ of *Bombyx rubi*, of *Spilosoma fuliginosa* and *Nemeophila russula*; (2) imagines of *Tephrosia crepuscularia* = *biundularia* = *bistortata*, all of which were conspicuous by their absence. It was a fine spring day, but moths were few, except *Tortricodes hyemana*, which was unusually abundant. *Asphalia flavicornis*, *Phigalia pedaria* (*pilosaria*), *H. leucophæaria*, and *Diurnea fagella* were represented by one each; and I took two examples of *A. æscularia*. An entomologist I met in the Forest showed me his box with three male *Nyssia hispidaria*, four or five fine *Amphidasys strataria* (*prodromaria*), and a similar number of *P. pedaria* (*pilosaria*), the last being undersized males and not well marked. I saw several *Brephos parthenias* on the wing. Larvæ of *Arctia caia* have not been nearly so plentiful as in last spring. I took a lot on April 2nd, as well as on subsequent dates in the month. They were in their first and second stages after hybernation. I kept them in an average temperature of 60° Fahr., and they all repaid my trouble, by the end of June, by turning out the most typical moths imaginable. I took my first *T. biundularia* (?) on April 3rd, in Delamere Forest, very dark, as usual, but well banded. My other captures were two *Lobophora carpinata* (*lobulata*), one *P. pedaria*, and a *Tæniocampa cruda*, all at rest either on trees or palings. Although I saw my first swallow on April 17th, we had a cold, wet and miserable Easter week. It was indeed a pitiful time for hunters of *Agrotis ashworthii*; and disappointment and discomfort must have been general, especially among those who had travelled long distances by excursion trains. Some were blocked at Chester on Good Friday—no trains! I got a few larvæ, but not by the labour of my own hands (and feet), and half of these died. On April 24th I again visited Delamere Forest for *T. biundularia*. I took six—three males and three females—one *carpinata*, and a nice *Eupithecia* not yet determined; and these were the sum total of five hours' hard work! Larvæ of *B. quercus*—they are observers of neither times nor seasons—in the second stage, were occasionally met with in May, in damp hedge roots about Chester, feeding on meadow sweet. They were very fond of sallow in confinement. As I write (July 22nd) some of these larvæ have already spun up; others are feeding, and evidently intend to continue doing so, whilst a fine female emerged at the end of June, but I think from last year's pupæ—I am, however, uncertain about this. My first white butterfly I saw on May 1st, in Eastgate Street—*Pieris rapæ*; in fact the "whites,"

including *P. brassicæ* and *Euchloë cardamines* (the latter very local), were common in May; and so were *Heliaca tenebrata* (*arbuti*) among the buttercups, and, in marshy places, the graceful little "blue" dragonflies, *Agrion puella* and *Ischnura elegans*. On May 24th a Chester friend sent me a couple of large dark reddish brown Geometer larvæ found feeding in his garden on ivy. About the middle of June they turned out a fine male and female *Boarmia rhomboidaria*. On May 29th I went to Delamere Forest again for *T. biundularia*. The moth was over. I took two *Cidaria corylata*, and several very variable *Tortrix ministrana*. Larvæ from low birches were four *Geometra papilionaria*, all free from parasites. Several *A. flavicornis*, *Tortrix corylana*, and one of *Hybernia aurantiaria*. Three of the *G. papilionaria* emerged as moths on July 2nd and 3rd, the fourth on the 17th. Between June 2nd and 10th *E. pulchellata* appeared in my breeding-pots, from last year's larvæ taken in Delamere Forest from foxglove flowers in July. June 5th was one of the most enjoyable days spent in the Forest district (Whitegate Heaths). Object: *Cœnonympha typhon* (*davus*), but it was not in evidence. Other insects were *Ematurga atomaria* (abundant and variable), *Melanippe sociata* (*subtristata*), *Acronycta rumicis*, *Hypsipetes impluviata*. Beetles, such as *Cicendela campestris* and Coccinellidæ, were on the wing in green and scarlet, common and numerous. Dragonflies were represented by *Æschna juncea*, plenty of *Leucorrhinia dubia*, and *Enallagma cyathigerum*, together with numbers of *Libellula quadrimaculata*. The hot sun made the birches give out a strong primrose-like scent. I nearly trod on a linnet's nest full of loudly protesting youngsters. Now followed some cold non-entomological weather, which changed all at once to the proverbial "Queen's"—appropriately enough on Jubilee Day (June 22nd). On the 23rd I found a freshly emerged black *A. betularia* at Chester; in fact we only seem to get the type now in Delamere Forest, and there it occurs side by side with the black form. June 24th and 25th were dull quiet days, the very weather for rock and tree hunting in the early morning. June 26th, Delamere Forest. Hot and sunny. *Thecla rubi* plentiful, but in poor condition. Other lepidopterous insects were *Nemeophila russula*, *Pseudoterpna pruinata* (*cytisaria*), *Drepana falcataria* (*falcula*), *Eubolia palumbaria*, and a few other common geometers. Generally speaking, this appeared to be a gala day at Delamere among the local insects, for I never saw so many at a given time. True the gadflies took a liberal tax from the human onlooker, until a blow from the hand settled the account. For days afterwards there would be little swellings and smartings at the punctures, but all this is inevitable if we get into such company. Ichneumons were busy and quick in their movements among the leaves, where, curiously enough, there seemed to be no larvæ. One wasp-like species, with a pair of long tail-like appendages, I tried hard to get, but failed. Great spiders in pea-green, and with a rose-coloured patch on the abdomen, sat on the birch leaves, whilst a beetle, with dark bronze-green thorax and bronze-brown wing-cases (possibly *Phyllopertha horticola*), spun and danced without moving an inch from directly over the centre of the birch bush. It is to be hoped the creature's enjoyment was commensurate with its activity. I only saw one *C. typhon* (*davus*) at Delamere this season—July 3rd—a fine fresh female full of eggs, and of course I let her go. Curious that *Anarta myrtilli* should be so comparatively scarce, while, on the other hand, *Plusia gamma* appears to have obtained a new lease of life. On July 14th a fine *Æ. grandis* was brought to me, which had flown into a shop in the city the previous evening. Altogether the present

season promises to be a good one. There was some cloudy, warm, showery weather about the 10th, which ought to have attracted good things to sugar for collectors favourably situated.—J. ARKLE; Chester.

SOCIETIES.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*July 19th*, 1897.—Mr. G. H. Kenrick in the chair. Mr. Bradley showed cocoons and imagines of *Apanteles formosus*, an ichneumon parasitic on *Urapteryx sambucata*, the cocoons being suspended from leaves, &c., by means of long filaments; also a male *Sirex gigas* from Sutton. Mr. Kenrick showed some Lepidoptera from Inverness-shire. *Anarta melanopa*, which he said was not long ago supposed to be confined to Rannoch, is now known to occur thoughout Inverness-shire, about 3000 feet above the sea-level; and also he had seen it in another locality. The specimens exhibited came from a spot nearly on the borders of Inverness-shire and Perthshire, where the species is common. He also showed, from the same county, *Hadena glauca*, which was common; *Scodonia belgiaria*; a *Nemeophila plantaginis*, with dark females, which he said were probably var. *hospita*. Mr. Chase exhibited living larvæ of *Eriogaster lanestris*.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

RECENT LITERATURE.

Descriptive List of the British Anthomyidæ. By R. H. MEADE, F.R.C.S., &c. Two Parts. 8vo, pp. 79. London: Gurney & Jackson. 1897.

ALTHOUGH the order Diptera is gradually attracting more students, it has always been strangely neglected in England; and while France, Holland, Austria, Italy, and even Lapland possess good monographs, we have nothing beyond one or two introductory works, lists, and the obsolete and avowedly incomplete volume in the 'Insecta Britannica,' by Walker. Hence every fresh contribution to the literature of British Diptera by a competent author is likely to be very useful to the student; and Mr. Meade, who has been working at the Diptera many years, has done well to publish a series of descriptions of the British genera and species of the interesting and extensive family of Anthomyidæ, of which he published a preliminary list, in the 'Entomologist's Monthly Magazine,' some years ago. We hope that other dipterists may be encouraged to do the same good service for other families; and that by and bye one of them may take courage and give us a complete book on the dipterous fauna of Britain, for which there could be no more admirable model than Schiner's two volumes on Diptera in the 'Fauna Austriaca.' —W. F. K.

THE ENTOMOLOGIST

Vol. XXX.] OCTOBER, 1897. [No. 413.

EPINEPHELE TITHONUS, ♂ AB.

The remarkable aberration of *E. tithonus* figured above was taken by Mr. Henry J. Spindler near Luggershall, Sussex, on July 29th. The normal fulvous colour is present in its usual intensity, but the whole of the typical dark brown is replaced by a pale pinkish ochreous; the subapical spot of fore wings and the sex brand are also of this colour. In the figure the shaded portions represent the fulvous tint proper to the species, whilst the pale portions show the aberrant colour. The under surface is affected in the same way.

Referring to the aberration of this species, Mr. Barrett (Lep. Brit. Isl. i. p. 247), after discussing variation in the spot markings, says:—"Still another form of variation, or rather aberration, consists in the substitution of pale yellow, or silvery white, for the fulvous ground colour, the brown markings being unaffected, or even intensified; as in a male in Mr. H. Goss's collection, having broad dark brown margins and central cloud, yet the ground colour nearly white. Mr. S. J. Capper has a straw-coloured male, one sent me from Gloucestershire by Mr. R. C. L. Perkins is whitish except a fulvous tinge near the marginal band, and Dr. Mason has one with the fore wings half

fulvous, half white. Mr. S. Webb has both sexes of a clear silvery white, the female combining with this the other variation of large extra spots in the fore wings; also one in which the hind wings are shaded with white from the margins; and Mr. S. Stevens, besides a silvery white female, taken at Torquay, and another of the same sex in which the marginal band has disappeared, has a male without the subapical black spot."

All the instances mentioned above are ground colour aberrations, with the exception of the last but one; that example, however, must be very different to the specimen now figured.

Mr. Tutt informs us (*infra*) that he has a specimen of this species which is somewhat similar to that captured by Mr. Spindler, also parallel forms of *Erebia goante*. I may mention that a figure of *Pararge* (*Satyrus*) *egeria* in the 'Tijdschrift voor Entomologie,' 1865 (pl. ii. fig. 1), represents a specimen in which the usual dark brown is changed to pinkish ochreous, but the central area of primaries and the costal and upper portion of the outer margin of secondaries are slightly suffused with dusky. The black spots retain their normal appearance.

R. S.

ON A LUTESCENT ABERRATION OF *EPINEPHELE TITHONUS*.

By J. W. Tutt, F.E.S.

In connection with the lutescent aberration of *Epinephele tithonus* exhibited at the meeting of the South London Entomological and Natural History Society, held on Sept. 9th last, I may mention that I have a somewhat similar specimen of this species, and also parallel forms of *Erebia goante*, in which the dark colour is reduced and altered, although the orange portions of the wing remain normal, and, by comparison with the pale surrounding area, appear redder than it usually does in these species. Further, I have an exactly parallel aberration of *Angerona prunaria*. All these aberrations are without doubt quite natural; but in the course of some experiments which I carried out with Mr. Coverdale some fifteen years ago, we discovered that the black-brown of *Epinephele* was very inconstant, and liable to change. With regard to the probable interpretation to be put on these natural aberrations, in the light of our previous experiments, I made the following remarks in 'The British Noctuæ and their Varieties' (vol. ii. pp. ix–x, 1891):—"Perhaps one of the most interesting results with an alkali is to get a direct development of yellow leading up to the brown, as exemplified in typical *Cœnonympha pamphilus*, *C. davus*, &c. ler the action of ammonia the pale under sides and fringes of

these species become very yellow, and lead insensibly into the normal brown coloration. It would seem therefore that the general action of alkalies, in this direction, is to develop progressive coloration—white (pigmented) to yellow, and yellow to red (-brown); whilst Mr. Coverdale wrote in 1886 (error for 1884),* that 'a great many acids (hydrochloric, nitric, sulphuric) restored the pigment, when thus changed to its natural colour.' Whilst dealing with this relation of brown and yellow, I would notice that the dark brown edging to the anterior wings of *Epinephele tithonus*, *Cœnonympha pamphilus* ab. *lyllus*, and their allies is much more readily acted on than is the orange colour in this species, which is rather remarkable when the colours are considered in their genetic relationship, but is not at all so from a varietal point of view. The unstable character of this band is very marked, and only occurs occasionally in certain varieties of some species, although it is quite constant in others. Here then we notice that a colour in a condition of transition or formation may be, and probably is, more unstable than the colour from which it springs, although the latter, genetically considered, is of course lower than the former. . . . The transitional and unstable character of the darker colour in *Epinephele* and its allies gives a decided proof of their probable recent development. The brown found in those varieties of *Angerona prunaria*, in which the bright orange is reduced to a patch in the central area of the wing, is also of a very unstable nature, and easily affected; not so the orange, which is particularly stable," &c.

It is many years since I interested myself in this branch of the subject, my notes, that I published in 1891, having been made between 1881 and 1884, or thereabouts, possibly before I had contributed to any entomological magazine; but it seems to me that the explanation offered is a sound one with this addition. The recent researches into the structure of the scales of Lepidoptera, and the physiological conditions involved, both subjects which I have recently dealt with at length, suggest that whenever a natural aberration is the result of the degradation of a pigment considered genetically, it sometimes produces much the same result as the reduction of the pigment treated chemically—that is to say, both may produce atavic results; in fact, these natural aberrations are the only guide one has to tell whether the colours produced chemically are indeed primitive forms of the coloration of the insects or not. At any rate, that is the only explanation I have to offer of the fact that these aberrations are so generally distributed among orange-coloured species with a tendency for some part of the orange to be replaced by some darker shade of brown.

I may add that I have a recollection that this particular

* "The Action of Ammonia upon some Lepidopterous Pigments," Entom. xvii. pp. 204–206.—Ed.

aberration of *E. tithonus* is so far well known on the Continent as to have received a distinct varietal name, but I cannot call to mind the reference at the present moment.

[The only named variety of *Epinephele tithonus* of which I have seen any description is v. *mincki*, Seebold (Berl. Ent. Zeit. xxxvi. 467 (1892), but this hardly agrees with Mr. Spindler's aberration.—R. S.]

ACOSMETIA MORRISII, Morris.

By H. Guard Knaggs, M.D., F.L.S.

May I be allowed to correct some inaccuracies which occur in Mr. Meyrick's 'Handbook of British Lepidoptera,' p. 121, respecting an insect which is there referred to as *Caradrina morrisii*, Dale?

In the first place the late Mr. Dale never described the insect in question; he may have ticketed it *morrisii*, but manuscript names are not now recognized. It was the late Rev. F. O. Morris himself who described his own namesake; therefore the name, if resuscitated, should be *morrisii*, Morris.

In Mr. Meyrick's 'Handbook' it seems to be taken for granted that *morrisii*, Morris, and *bondii*, Knaggs, are identical; not only that, but *morrisii* has been redescribed, and one of its features, the "slightly brown costa," which *bondii* does not possess, has been omitted, whilst the dotted second line of *bondii*, which is absent in *morrisii*, has been added; so that the description of *morrisii* must have been taken from *bondii*, and it is pretty evident that the writer of it has never seen either *morrisii* or the original description of it.

The sanction of the name of so high an authority as Mr. Meyrick to the statement that *morrisii* and *bondii* pertain to one and the same species is, in my opinion, calculated to stifle independent investigation, and to deter the entomological public from referring to the original description; otherwise I should not have taken the trouble to notice it. As it is now just sixty years since the original description saw the light of publicity, there seems danger of its becoming lost in the mists of antiquity; and as no entomologist living or dead, with the sole exception of Humphreys and Westwood, has alluded to it until quite recently, I trust that you will permit me to lay it before your readers, in order that they may judge the case for themselves. It is extracted from 'The Naturalist,' vol. ii. p. 88, 1837:—

"Notice of the Discovery of a New Insect, Acosmetia morrisii, *Dale MSS.*—I have great pleasure in forwarding for your pages a description of a species of *Acosmetia*, which I believe to be entirely new to entomologists. My kind friend Mr. Dale has been so good as to

name it after me, as the discoverer of the insect. The following is a general description :—

"Pale straw-colour approaching to silvery white, the upper part of the wings very faintly streaked with narrow brown lines, diverging (from an obscure black dot?) towards the margin, which is of the same colour with the rest of the wings, from which they are hardly distinguishable; the wings underneath* are divided transversely by a faint waved brown line, and the margins clouded with the same colour. The insect is an inch and half a line in width from tip to tip, and is not thick bodied, though belonging rather to that class than to the thin bodied. The first specimens I took were met with, several years ago, near Charmouth, Dorsetshire, beyond a lime-kiln on the cliff on the east side of the little river Char. I believe individuals may be taken there every year, though they certainly are not common. They rise up from the grass and fly well and straight, on being disturbed in the daytime, somewhat after the manner of *Plusia gamma* (when not flying voluntarily), and are rather difficult to capture. They seem to be † among the long grass, to which they assimilate in colour. I do not remember the exact time of their appearance, but it was about the middle of summer, and they remained 'out' a considerable time. Mr. Dale has also taken specimens at the same locality.

(Signed) FRANCIS ORPEN MORRIS."

"April 4th, 1837.

N.B.—In comparing the above description of *morrisii* with *bondii*, it should be borne in mind that the latter never flies by day, at least that is the experience of all who have collected on the ground with whom I have come in contact; and also that the grass to which *bondii* is attached is dark green in the hottest summer.

Messrs. Humphreys and Westwood (vol. i. p. 244, and plate, 1843) give a figure of an insect with narrow pointed wings, purporting to represent *morrisii*. The wings are all four of the same colour, namely, pale ochreous whitish, toned with pale reddish brown towards the margins, with two faint transverse lines, but no dotted second line. The letterpress says that the fore wings, hind wings, and body are all pale straw-colour, and that the costa is slightly brownish.

Curiously enough, the Rev. F. O. Morris himself published, in 1872, his popular illustrated work on 'British Moths,' in which he made no mention whatever of *morrisii*, but gave an excellent figure of an insect which he called *bondii*, and said that it occurred at Folkestone. He apparently was unaware of the Lyme Regis locality discovered in 1863 by my old friend Percy Wormald.

Folkestone, September, 1897.

Errata in original { * For "wings underneath" read "under wings."
† For "be" read "lie."

SYNONYMIC NOTES ON AQUATIC RHYNCHOTA.

By G. W. Kirkaldy.

I am aware that this paper will not meet with approval from many Rhynchotists, owing to the number of nomenclatural changes it necessitates; nevertheless, I believe that such changes are, in the end, for the good of science, and that therefore the sooner they are done the better.

Fam. Hydrometridæ.

1. Hydrobates, Erichson, 1848, is preoccupied by Boie (Aves, 1822), and also by Vieillot and Temminck (Aves—Cuculidæ and Anatidæ); it will be therefore necessary to employ Cylindrostethus, first characterized by Fieber, Europ. Hem. 33 (1861); as, however, no species was there assigned to it, one must write *Cylindrostethus*, Mayr, that author being the first to adopt a species.

The synonymy can therefore be thus stated :—

Cylindrostethus, Mayr, Verh. zb. Ges. Wien xv. 444 (1865), (Fieb. Europ. Hem. 33, 1861).

= *Hydrobates*, Erichs. in Schomb. Faun. Brit. Guiana, 614 (1848) [nec Boie].

Type. *Hydrobates linearis*, Erichs., *l. c.* 614.

2. The following species of *Gerris*, mentioned in Stephens's Syst. Catal. Brit. Ins. ii. (1829), are merely list-names, descriptions not having been published, viz. *aterrima* (353), *brachypteryx* (352), *nana* and *phæoptera* (353), and *thoracica* (352) [not necessarily *thoracica*, Schummel].

In Lethierry and Severin's invaluable Catal. génér., MS. species are not noticed. It would, I think, have been an advantage had these been added, as one often has occasion to examine specimens labelled with unfamiliar names, which may be either MS. or belonging to species the descriptions of which one has overlooked.

3. Fam. Gelastocoridæ, nov. nom. for Galgulidæ.

Type genus. Gelastocoris, nov. nom. gen. for *Galgulus*, Latr., 1802, preoccupied by Brisson (Aves), 1760.

Type. *Naucoris oculata*, Fab., 1798.

4. Fam. Belostomatidæ.

Deinostoma, nom. gen. nov., for *Serphus*, Stål, 1862, preoccupied by Schrank, 1780, and Haliday, 1832. It is a pity that Mayr did not adopt a new name in his Monograph (1871) instead of merely indicating that a change was necessary. The type will of course be *Belostoma dilatata*, Say, and the principal references as follows :—

DEINOSTOMA DILATATUM (Say).

Belostoma dilatata, Say, New Harmony, 38 [1832?]; reprint in Ann. Rep. N. Y. Agric. Soc. 810 (1858), and in Complete Writ. i. 366 (1869); Walker, Catal. Hem. Brit. Mus. viii. 177 (1873).

Zaitha stollii (nec Am. Serv.), Herr.-Schf. Wanz. Ins. ix. 35, pl. 292, f. 897 ♂, f. 898 ♀ (1853) [*fide* Stål and Uhler].

Serphus dilatatus, Stål, Stett. Ent. Zeit. xxiii. 462 (1862); Mayr, Verh. zb. Ges. Wien, xxi. 403 (1871); Uhler, Bull. U.S. Geol. Surv. (2), v. 338 (1876).

5. Fam. CORIXIDÆ.

Corixa annexa (Uhl.), Walk. Catal. Hem. Brit. Mus. viii. 199 (1873), is MS. (*fide* Uhler).

6. *Corixa esculenta*, Motsch., Etud. Entom. v. 77 (1856); there is no description, merely a note to the effect that the ova are used for food in Egypt. A reference to this species is given by Guérin-Ménéville, Bull. Soc. Zool. Acclim. iv. 581 (1858). [This date is usually quoted 1857, but as the séance was held Dec. 4th, 1857, it is unlikely that publication took place before 1858.]

7. *Corixa atomaria*, Illiger (Puton), or Germar (Fieber).

This name appears to be MS., as regards the two older authors quoted; the earliest description I can trace is that of Fieber, Bull. Moscou, xxi. (pt. 1), 515 (1848), which is later than that of *C. panzeri*, *l.c.* 515, and also than that of *C. affinis*, Leach, Trans. Linn. Soc. Lond. xii. 18 (1818); this last name—*affinis*—must therefore be used. I am indebted to Dr. Puton for information regarding Illiger, but I fear that with his strong views upon the Law of Prescription, he will not approve of the use to which that information has been put.

The synonymy of *C. affinis* stands at present:—

C. AFFINIS, Leach.

C. affinis, Leach, *l.c. supra.*

panzeri } Fieber, *l.c. supra.*
atomaria }

panzerii } Fieber, Abh. k. böhm Ges. Wiss. (v.) 7, 227, pl. 1, f. 3 and 5 (1851).
atomaria }

panzeri and *affinis*, B. White, E.M.M. x. 61 and 76 (1873).

salina, Thoms., Opusc. Ent. i. 29 (1869).

(var.) *atomaria* var. *conglomerata*, Rey, Rev. d'Ent. ix. 29 (1890).

It is also the *striata* of Panzer and the *graphiptera* of Rambur, and I believe (though Reuter says this equals *C. geoffroyi*, Leach) that it is *striata*, Geoff., Hist. abrég. i. 478, pl. ix. f. vii. (1762), in which case *affinis* would be the type-species of the genus *Corixa*).

I cannot imagine why nearly all my colleagues prefer the spelling CORISA; Geoffroy wrote CORIXA, but since his time many erudite authors (from Amyot and Audinet-Serville, 1843) have laboured to show that *Corisa* is the correct orthography; the word is presumably derived from Greek "koris," the stem of which is "kori-"; it is evident therefore that the suffixes "-xa" and "-sa" are both merely ornamental, and equally correct in a grammatical sense; in any case Geoffroy's original orthography should be adhered to.

8. MICRONECTA, nov. gen. nom., for *Sigara*, Fab. Ent. Syst. iv. 60 (partim), 1794, and Syst. Rhyng. 104 (partim), 1803, et auctt.; neque Fab. Syst. Ent. 691 (1775), neque Gen. Ins. 177 (1776), neque Spec. Ins. 332 (1781).
Type. *Notonecta minutissima*, L. (*Sigara minutissima*, auctt.).

It is extraordinary that Fabricius's genus should have been used so long for the tiny water-bugs of which *Notonecta minutissima* is the representative. It was erected in 1775, Syst. Ent. 691, for one species—*striata*—which the author quoted as *Notonecta striata*, L.; he further cited as a synonym (!) of his genus Geoffroy's *Corixa*. The two genera *Corixa* and *Sigara* are thus absolutely identical, and the fact that *S. minuta* (*minutissima*, L.) was added in 1794 cannot affect this. Thirty-nine species have been described and grouped under the genus, of which four belong to another genus; the remainder represent perhaps twenty-five species.

SUMMARY.

1. *Cylindrostethus* (Fieb.) Mayr, should replace *Hydrobates*, Erichs. (nec Boie). Type: *C. linearis* (Erichs.).

2. *Gerris aterrima, brachypteryx, nana, phæoptera* and *thoracica*, Stephens, are MS.

3. Gelastocoridæ, nov. fam. nom., for Galgulidæ. *Gelastocoris*, nov. nom. gen. for *Galgulus*, Latr. (nec Brisson). Type: *G. oculatus* (Fabr.).

4. *Deinostoma*, nov. nom. gen. for *Serphus*, Stål (nec Schrank). Type: *D. dilatatum* (Say).

5–7. *Corixa annexa*, Uhl., *esculenta*, Motsch., and *atomaria*, Illiger, are MS. *Corixa affinis*, Leach, 1818, should replace *C. atomaria*, Fieb., 1848.

8. *Micronecta*, nov. nom. gen. for *Sigara*, Fab. (1794, in part) et auctt. (nec Fab., 1775). Type: *M. minutissima* (L.).

Sept. 7th, 1897.

DESCRIPTIONS OF SOME NEW SPECIES OF CLYTHRIDÆ AND EUMOLPIDÆ.

By Martin Jacoby, F.E.S.

Tellena angusticollis, n. sp.

Elongate, subcylindrical, metallic green; antennæ black; thorax narrowed in front, closely and finely punctured; elytra extremely closely punctured and finely rugose. Length 8–10 mill.

Head rather closely and finely punctured, with a deep depression between the eyes, the latter elongate, notched at the inner margin; labrum and mandibles black; antennæ, scarcely extending beyond the base of the thorax, black, the first joint metallic green, the following two joints also stained with metallic blue, very small, the others strongly serrate; thorax twice as broad as long, the sides rounded and distinctly narrowed in front, with a narrow reflexed margin, the surface closely impressed with fine and larger punctures; scutellum very broad, finely punctured; elytra more closely but scarcely more strongly punctured than the thorax, the interstices finely transversely wrinkled; under side metallic green, like the upper surface, but clothed with fine grey pubescence, thickly so on the abdominal segments; legs long and slender, the tarsi black, claws bifid.

Hab.—Brazils, St. Paulo.

This species has no doubt been confounded with the only other one which constitutes the genus, but it is quite distinct, although the resemblance is very great.

Lacordaire, who has described the type *T. varians*, has already drawn attention to the great variability of the insect, and says that one could easily separate two species, if only the extreme forms were before one; but he only founded these remarks on the sculpture of the thorax and the elytra; and it is probable that he overlooked the shape of the thorax, although this is difficult to imagine in an author so experienced as Lacordaire. In any case, I have before me three specimens, which not only differ in the finely rugose elytra, of which I cannot see a trace in the typical form, but in which the thorax is distinctly narrowed in front, the same part in *T. varians* showing an equal width in all the specimens I have for examination, so that the thorax may almost be described as transversely subquadrate. This, I think, justifies my separating the two insects, especially as it is not a solitary case.

Urodera lacordairei, n. sp.

Black, closely pubescent below; antennæ and legs fulvous; thorax very closely punctured, transverse; elytra finely punctate-striate, the interstices sparingly punctured, the sides, base, and apex with a narrow fulvous band extending inwards to the middle of the suture. Length 6 mill.

Head nearly flat, slightly bronze-coloured, very closely and finely

punctured, scarcely depressed between the eyes; antennæ extending very nearly to the base of the thorax, entirely fulvous, the apical joints slightly darker, the fourth and following joints broadly transverse; thorax twice as broad as long, convex, the sides rounded, the median lobe strongly produced and truncate, the surface very closely and finely punctured throughout; scutellum impunctate; elytra not narrowed posteriorly, rather regularly and finely punctate-striate, the interstices with a few very fine punctures only here and there; the shoulders not prominent; the disc black, with a slight æneous gloss, margined with a narrow band of fulvous, which is more or less interrupted at the sides below the middle, where it is also much narrowed, leaving part of the lateral margin of the ground colour, from the basal margin, this band extends obliquely downward towards the suture, where it ends near or below the middle; under side thickly clothed with yellow pubescence; legs fulvous, tarsi fuscous, moderately robust; mesosternum truncate at its apex.

Hab.—Brazils, Maranos.

This species can only be compared to *U. hamatifera*, Lac., which it entirely resembles in regard to the pattern of the elytra, but the fulvous antennæ and legs will at once distinguish it; the thorax in the present insect is also much broader and more distinctly punctured; the apical fulvous mark is in shape of an ovate spot. It is the only species of the genus having fulvous-coloured legs. Two specimens are contained in my collection.

GLYPTOSCELIS GIGAS, n. sp.

Elongate, subcylindrical, piceous, covered with white pubescence; thorax broader than long, marked with three white bands; elytra finely rugose, with longitudinal bands of white pubescence of variable width. Length 12 mill.

Head closely covered with white pubescence, impressed with a narrow central groove; the epistome not separated from the face; labrum and palpi piceous; antennæ extending slightly beyond the base of the elytra, piceous, the second joint half the length of the third, this and the fourth joint equal, terminal joints slightly shorter and thickened; thorax subcylindrical, one half broader than long, the sides slightly rounded at the middle, the posterior margin broadly but moderately produced, the disc very closely and finely rugose-punctate, the pubescence forming a broad band at each side and a narrow one at the middle of white hairs or scales; scutellum broader than long; elytra slightly transversely wrinkled here and there, everywhere clothed with short scale-like white hairs, forming narrow longitudinal bands, with a broader and more conspicuous one at each side, below likewise densely pubescent; the legs slender, the claws bifid; the inner division very short.

Hab.—Brazils.

This is not only the largest species of the genus, but of the whole of the group Myochroinæ, to which *Glyptoscelis* belongs. The single specimen I have seen is contained in the collection of

the Oxford Museum, and was obtained by Myers, without particular locality being given.

GLYPTOSCELIS PARAGUAYENSIS, n. sp.

Elongate, subcylindrical, obscure æneous; antennæ and legs obscure fulvous; thorax very finely punctured, clothed with whitish hairs; elytra more strongly and distantly punctate, greenish-æneous, clothed with white and fulvous pubescence, the apex of each not produced. Length 6 mill.

Head closely covered with whitish and fulvous hairs; labrum fulvous, shining; eyes deeply emarginate; antennæ fulvous, extending beyond the base of the elytra, the basal joint blackish, the second short, the third longer than the fourth joint, terminal joints widened (the last three joints wanting); thorax subcylindrical, nearly twice as broad as long, the sides rounded at the middle, narrowed near the base and apex, the anterior angles pointed, the disc closely and rather strongly punctured, piceous, closely covered with white and yellowish hairs placed transversely, the middle with a feeble ridge; scutellum subquadrate, with a few hairs; elytra greenish æneous, more strongly and distantly punctured than the thorax and similarly pubescent, the pubescence forming small white or fulvous very indistinct patches, the apex of each rather truncate; under side and legs thickly pubescent, claws deeply bifid.

Hab.—Paraguay.

This species differs from *G. æneipennis*, Baly, in the want of the elytral transverse rugosities, and in not having their apex produced into a point; *G. fascicularis*, Baly, is larger, and has four pubescent thoracic bands; and *G. cryptica*, Say, is of a non-metallic colour, and has also pointed elytral apices and simple claws.

MYOCHROUS CURCULIONOIDES, n. sp.

Dark fuscous, clothed with yellowish scale-like pubescence; antennæ dark fulvous; thorax subcylindrical, projected anteriorly, rugose-punctate and pubescent; elytra coarsely and closely punctured, the interstices wrinkled throughout, the sides and apex yellowish; femora with a short tooth. Length 6 mill.

Of elongate and subcylindrical shape; the head perpendicular, finely rugose, and clothed with short yellowish pubescence in shape of scales; labrum and palpi fulvous; antennæ not much extending beyond the base of the thorax, fulvous, the terminal five joints broadly widened at the apex only, the third and the following two joints elongate, nearly equal; thorax subcylindrical, the sides forming a distinct tooth before the middle, the anterior margin strongly produced at the middle and forming two elevations at the top, the intermediate space of which is depressed, the surface strongly and closely rugose, clothed with yellowish scales at the sides, forming an ill-defined band; elytra much wider at the base than the thorax, closely impressed with large round punctures, the interstices everywhere rugose or wrinkled, clothed with dark and yellow scales, which near the apex form a transverse distinct band, some smaller yellowish

spots are also seen near the shoulders and below the base; under side black, similarly clothed with yellowish scales; all the femora armed with a short tooth, the anterior ones very obsoletely so.

Hab.—Bahia.

The specimen contained in my collection was named as above by the late Lefèvre, but has not been described to my knowledge.

NOTES AND OBSERVATIONS.

Lepidoptera Phalænæ of the Whole World.—The Trustees of the British Museum have sanctioned the publication of a series of volumes on the Moths of the world, and the commencement of this important work will be undertaken by Sir George Hampson. It will comprise synopses and descriptions of the families, genera, and species of Moths, and include every described species about which exact information is obtainable. The type of each genus will be indicated, and full details regarding the geographical distribution of the species will be given. There are to be figures in the text illustrative of each genus and prominent section thereof, and the structural characters upon which the genus is founded will be shown. The general arrangement of the work will be based on the lines of classification recently brought most prominently before us by Mr. E. Meyrick in his 'British Lepidoptera.' There is probably no question about the system upon which Meyrick's classification is founded being valid, and taken as a whole his arrangement of groups and families appears to be a natural one. As regards the composition and sequence of genera, however, it would seem that both are open to judicious revision. It is further proposed to issue, in parts, an atlas of coloured plates giving half figures of as many as possible of the species which have not previously been satisfactorily figured, especially of "types" in the British Museum. We are very pleased to learn that the Museum authorities have determined on this step, as a work of such a comprehensive character produced under their auspices must do much towards establishing something definite in the way of classifying the old-style Lepidoptera-Heterocera, and at the same time bring entomologists into line on the question of nomenclature.

British Mymaridæ.—In the September number of 'Knowledge' there is a highly interesting article by Mr. Fred Enock on "Fairy Flies" (Mymaridæ). These hymenopterous atoms have not received very much attention from entomologists; but, as Mr. Enock suggests, "One reason for this want of attention is, no doubt, because of the extreme smallness of the members of this family, the largest being not more than one-twentieth of an inch long, whereas the smallest is less than one-eighty-fifth of an inch from head to tail." Dr. Sharp ('Insects,' pt. i. p. 538) says: "Probably Mymarides may all prove to be dwellers in eggs of other insects"; and as regards the British species, it would appear that Mr. Enock believes this to be the case, as he states: "All the species are egg parasites, and each species has

its peculiar taste, selecting with unerring instinct the right kind of egg—generally that of an injurious insect—in which the female lays one of its own eggs, which in due time hatches or develops into an active maggot." The number of British species is given as thirty-five, and these are distributed among the eleven genera as follows:—*Ooctonus* (4), *Gonatocerus* (5), *Alaptus* (2), *Litus* (1), *Eustochus* (1), *Mymar* (1), *Cosmocoma* (8), *Caraphractus* (1), *Anaphes* (7), *Anagrus* (4), *Camptoptera* (1).

Rearing Bombyx rubi.—As a rule, considerable difficulty is experienced in obtaining imagos of this species from larvæ that have to be kept in confinement throughout the winter. In an interesting article on rearing *B. rubi* (E. M. M., Sept., pp. 199–201), Mr. Robson tells us that he collects the larvæ during fine sunny days in the early months of the year, and so avoids the trouble of preparing hybernating quarters for them. Instead of putting the larvæ together in a breeding-cage, he encloses each one in a separate paper box about two inches square. The results appear to be very satisfactory.

Destroying Insects by Steam Power.—In America, machines constructed something on the plan of a steam fire-engine are employed to repel the attacks of insects on the foliage of shade trees, and the attention of growers of fruit on a large scale is called to this new method of dealing with insect pests. For further particulars and illustrations of these engines of destruction, the reader is referred to a pamphlet on the subject, entitled, 'The Use of Steam Apparatus for Spraying,' by L. O. Howard, Ph.D.

Studying Neuration without Removing the Scales of the Wings.—In an article on this subject ('Canadian Entomologist' for August), Professor Skinner points out that in the present day "Neuration can be studied with the greatest ease and accuracy, and permanently recorded in a photograph, or, more strictly speaking, a radiograph. The anatomy of a living chrysalis may be studied without removing the cocoon, and also the internal anatomy of the thorax and abdomen can be fairly well seen, and in time the process may be improved for this work. With the aid of the Röntgen or X-rays and the photographic plate one could make a picture of the neuration of the beautiful, rare, and curiously shaped *Ornithoptera paradiseæ*, and not disturb a scale on its superb wings. With the fluoroscope one could doubtless see all the neuration without even going to the trouble of making a picture."

Photography without Shadow.—Some time ago the 'Canadian Entomologist' gave a method of photographing insects without shadow. It was done by fixing the camera in a perpendicular position so as to look down upon a sheet of glass placed horizontally below, and beyond that a white screen, the insect being pinned to a small piece of cork attached to the glass. By this process the shadow was thrown through the glass on to the white screen at an angle quite out of the line of vision. Now I believe that professionals find considerable difficulty in adjusting their heavy apparatus to the perpendicular position, and I therefore suggest that it can be done quite as effectively by using the camera horizontally, and placing the insect on a piece of cork fixed to a perpendicular sheet of glass, with a white screen, also perpendicular,

a short distance behind it. I tried the experiment the other day, and the result was perfectly satisfactory,—the shadow fell upon the screen some inches to the side of the object.—H. G. Knaggs; Folkestone, September, 1897.

Strange Resting-places of Pieris rapæ and Satyrus semele.—During one of the brief periods of sunshine with which we were favoured on some of the later days of August, I had occasion to leave one place of business in a busy London thoroughfare, and proceed to another some hundred yards or so further on in the same street. On my way I happened to meet an acquaintance with whom I stood talking for perhaps ten minutes, during which time the sun became obscured by clouds. I was wearing an ordinary straw hat at the time, and on reaching my destination and hanging my hat on a peg, I was not a little surprised to find a female *Pieris rapæ* resting upon it. The butterfly was certainly not on the hat when I started on my journey, and I have no doubt that it settled there when the sun ceased to shine, selecting the hat as a secure resting-place by reason of the similarity of its colour to that of its own under side. Earlier in the month I had been staying at Bournemouth, and had spent many hours on the heaths and downs of the adjacent coasts, frequently being accompanied by my son. Both of us were in the habit of wearing grey flannel trousers, and I was much struck by the persistent way in which *Satyrus semele*, which was exceedingly abundant at the time, rested upon them almost whenever we stood still for a few moments, often returning again and again when driven away. I have little doubt that in this case also the similarity of the colour of the material rested upon to that of the part of the insect most exposed when at rest was the attraction.—Robt. Adkin; Lewisham, September, 1897.

Varieties of Melanippe montanata.—At a meeting of the South London Entomological and Natural History Society, held on August 12th last, Mr. J. N. Smith exhibited a specimen of *M. montanata*, in which the ground colour was heavily suffused with leaden grey; this was one of a pair of similar aberrations of the species taken June 10th, 1895, by Mr. Fitzgerald in a lane near Dursley. A somewhat similar specimen, from Longleat, in Wiltshire, is figured in the 'Entomologist' for 1881 (xiv. pl. 1, fig. 20).

Variety of Catocala nupta.—On August 3rd there emerged in my breeding-cage a variety of *Catocala nupta*, having the usually red portions both of the upper and under sides of the hind wings brown, with perhaps a very faint tinge of red. The larva was found on willow in the garden here.—E. V. Hall; 4, The Avenue, Brondesbury, N.W.

[Similar aberrations of this species have been obtained in the London district before (see Entom. xxv. 243, and xxix. 315). There is also an example, taken on August 10th, 1895, on Wandsworth Common, in the National Collection at South Kensington.—Ed.]

Variety of Nemeophila plantaginis.—About the middle of last June, I took a fine male specimen of *Chelonia* (*Nemeophila*) *plantaginis*, flying on the moors at Penmaenmawr, North Wales, in which the ground colouring of the *hind* wings is quite white instead of bright

orange, but with the normal black markings.—J. B. Morris; Maldon House, Maldon Road, Wallington, Surrey, September 22nd, 1897.

Vespa crabro.—I should be greatly indebted for any information afforded respecting the numerical strength of a hornet's nest. Though there must be many nests in this neighbourhood, I doubt whether any one nest contains more than one hundred or so. This formidable insect occurs in such plenty here this season as to prove a positive source of danger, and the fruit crops, especially the apples, suffer accordingly. Only a few hundred yards from the Vicarage, along the Stoke and Nayland Road, are two cottages under one thatched roof, inhabited respectively by two families related to each other, and comprising jointly probably about fifteen children. In the side of the thatch of the first cottage there is a hornet's nest; and in the thatch of a low outhouse, on the further side of the second cottage, there is another. It goes without saying that the time-honoured, and as a rule the best, plan for suffocating the inmates, by the application of a folded linen rag, alternating with layers of sulphur, and then set light to, cannot be adopted here, as the thatch would speedily be in a blaze; and moreover, in the case of the nest in the outhouse, it is believed to be several feet distant from the only hole of entrance, at the far end possibly of the old run of a rat, as the booming sound made by the insects is distinctly heard close to the rear of the building. The suspension of wide-mouthed bottles, containing a compound of sugar and beer, to the sides of the cottage and outhouse, has not been without the desired effect, as several hornets have crawled in, and got drowned. But this is only a partial remedy, and the wasps that have met a similar fate therein (many of them tree wasps, if I am not greatly mistaken) are far more numerous. Another method was for the father of one of the families, to whom I lent my insect net for the purpose, to catch them as they flew out and in; but this speedily had the natural effect of rendering them furious. I then suggested what seemed to me to be the only available method, namely, the insertion of a piece of lead piping in the hole, so that the hornets must pass through it on their way to the outer air, and the fixing at the same time of the other end of the said piping well into the neck of the aforesaid bottle (now suspended for the purpose close underneath). By this means many have been caught and drowned, including the queen, who may have only quitted the interior on the supposition, or intimation, that something was wrong. The nest in the outhouse has thus been considerably weakened, but the second nest still remains to be tackled. It cannot be seen to at present, as the cottagers are all so busily employed in getting in the harvest. There is also a third nest, within the distance of a short half-mile, down another lane, in the tiled roof of a cottage opposite the short cut across the fields to Boxford, and here the hornets, to reach their hole, crawl along the leaden gutter under the eaves. A fourth nest, situate in the root of a tree in Assington Park, was taken and destroyed several days since. Owing to the number of hornets that fly in and out of the numerous oaks in the wood known here as Assington Thicks, I feel convinced that there are several more nests undiscovered as yet,—probably in the hollows of some of the above-mentioned oaks. There is a little summer-house or shanty in this

wood, for the gamekeepers to shelter when it rains, and for several seasons past hornets have suspended a nest from the interior of its ceiling, flying in through the open pane of glass in its side. This year, however, they have not put in an appearance there. I believe one such nest in the shanty was cut down, and presented to the museum at Colchester.

During my short sojourn at this vicarage I have captured twelve hornets with my net as they came successively to regale themselves on the sap exuding from the trunk of an oak in the back shrubbery. I note that there is hardly ever more than one hornet at a time, either where the sap exudes or on a partially devoured apple. Probably there is not room for the operations of both. But if one be captured thereat, within a brief space (say ten minutes) another visitor, in brown and yellow jerkin, flies up with a sonorous hum to take his place. Sometimes, but more rarely, two may be seen together seated on one apple. Are these solitary visits due to some well-understood and defined arrangement between themselves? The present unsettled state of the weather here (sunshine alternating with clouds and frequent showers) renders the hornets all the more dangerous, as apt to creep about noiselessly in a semi-torpid condition resulting from the heavy wet. Query, do the queens leave the nest at this period of the year? It would seem so, as when my wife was in the orchard here a few days since, on picking up a fallen apple, she heard a loud buzzing in the grass close to the fruit, and in a few moments a hornet ascended a blade of grass and flew away. Luckily for herself she did not touch it, as at first sight she mistook it for a dragonfly, and from the size which she described it could only have been a queen.

Of late years, I have seen very few hornets in England, and during the whole of my residence in my Cambridgeshire parish I only recall the occurrence of one nest in the roof of a farmhouse or cottage three or four doors from the rectory, and taken by an elderly parishioner to whom various odd jobs were delegated, and commonly supposed to possess a very thick cuticle, at any rate he went about his work fearlessly. "They do *hom* so," he said. One of the very few occasions on which I have seen a queen hornet alive was in the winter season on the drawing-room window-sill of the said Cambridgeshire rectory, when it was in an almost torpid state, and covered with soot, and I naturally dreaded its presence on account of my children, who were then very young. I remember in boyhood's hour being greatly diverted at beholding an hornet sweep in its flight into a hole in the side of a large jargonelle pear, and no fewer than twenty wasps forthwith to tumble out therefrom in a state of the most abject terror to the ground. In those days also a relative observed a hornet seated on the bough of an apple tree, and tearing a hive bee to pieces for the sake of its honey-bag. The hornet does not always score, however, for while two English ladies were walking in the environs of Chexbres (Lake of Geneva) in the month of July, 1893, while I held the chaplaincy of that place, they recounted to me how a wasp and hornet dropped struggling together from an orchard tree in front of them, and how the wasp, being more agile, managed to dart about and sting his adversary here and there until the latter succumbed.—(Rev.) F. A. Walker; *Assington* Vicarage, near Colchester, August 24th, 1897.

CAPTURES AND FIELD REPORTS.

COLIAS EDUSA IN DORSETSHIRE.—One specimen captured at Swanage (*vide* Mr. Hall's note, p. 272).

COLIAS EDUSA IN CORNWALL.—I saw two specimens as I drove from Truro on Aug. 13th, and a day or so later a young friend showed me one that he had caught, saying that he had seen several. I do not know if the species has been recorded from other parts this year. I have not seen it for some years.—(Rev.) J. A. MACKONOCHIE; St. Columb, Cornwall.

COLIAS HYALE AND C. EDUSA IN SUSSEX.—Last Tuesday I took a female *C. hyale* near here, in a meadow close to a clover-field; in this same clover-field, about a fortnight ago, I caught a female *C. edusa*, and saw two males.—L. G. S. RAYNOR; Hill View, Bognor, Sept. 10th.

COLIAS EDUSA IN ESSEX.—Towards the end of August, my friend Mr. C. O. S. Hatton and myself made several morning visits to a very fine field of lucerne situated in this parish, and belonging to Mr. E. A. Fitch. The second brood of *Strenia clathrata* was very abundant, and we captured several interesting varieties. On Aug. 26th, almost immediately after entering the field, Mr. Hatton found a male *C. edusa*, resting on a lucerne stem. It was such a fresh specimen that I think it was undoubtedly bred on the spot, especially as within the next hour I captured two other examples, one male and one female, in the same part of this large field, whereas we did not see any more specimens, either on that or on any other day. We much regretted afterwards that we did not search for the empty pupa-case of the first specimen.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Sept. 11th, 1897.

COLIAS EDUSA IN THE ISLES OF SCILLY.—*C. edusa* was fairly common in the Isles of Scilly during the month of August, the earliest date being Aug. 2nd, but only one var. *helice* was taken.—B. W. ADKIN; Brandon House, Morden Hill, Lewisham, S.E.

COLIAS EDUSA IN THE ISLE OF MAN.—On 30th July last I captured a fine male specimen of *C. edusa* in an old gravel pit at Ramsey, Isle of Man. Is this not a rather northerly locality for this species?—(Rev.) B. HARVEY-JELLIE, B.A.; St. Helens.

[*C. edusa* has been recorded from Orkney.—ED.]

COLIAS EDUSA IN HAMPSHIRE AND KENT.—I saw a specimen on the coast at Lymington on Aug. 7th, and I have heard of a specimen being seen at Folkestone on Sept. 1st.—W. J. LUCAS; Kingston-on-Thames.

VANESSA ANTIOPA IN YORKSHIRE.—A specimen of *V. antiopa* was seen in Beedale, a beautiful wooded valley seven miles from Scarborough, on Aug. 9th. I have been at some pains to verify the record by communication with those who were actually on the spot and saw the insect, I myself being only a few yards distant, and feel no doubt as to its genuineness.—JAMES H. ROWNTREE; Westwood, Scarborough, Sept. 15th, 1897.

ACHERONTIA ATROPOS IN SUFFOLK.—A larva of *A. atropos* was recently found in a garden here. It was nearly full grown at the end of July.—EDWARD RANSOM; Sudbury, Suffolk, September, 1897.

DEILEPHILA GALII IN DEVON.—Mr. Bontnall (E. M. M., Sept., p. 212) records the capture of a larva of this species at Starcross, on Aug. 7th last.

CHŒROCAMPA CELERIO IN CAMBRIDGE.—A female example of this species was taken in the town on the 4th, and given to me on the 6th Sept. As it had passed the intervening time in a match-box, it was considerably damaged.—J. C. RICKARD.

SPHINX CONVOLVULI IN LONDON.—In Piccadilly, on the night of Sept. 14th, quite an interested crowd gathered to witness the capture of a single specimen of this moth. When taken it bore unmistakable evidence of having been handled roughly. It may possibly have been conveyed to this district by some vegetable cart; being attracted by light, it fell a victim to Mr. W. Henry Barton. The last captures of this insect were in 1887, when two fine specimens were taken, at rest, on a fence at Hammersmith Bridge, but were, I believe, not then notified.—H. W. BELL-MARLEY; Ravenscourt Park.

SPHINX CONVOLVULI IN WILTSHIRE.—Yesterday (Aug. 31st) a fine specimen of *Sphinx convolvuli* was brought to us by a neighbour, who had found it at rest on his house-door, probably attracted by the flowers in the garden.—CECIL M. GUMMER; Swayne's Close, Salisbury, Sept. 1st, 1897.

SPHINX CONVOLVULI IN SUFFOLK.—On Aug. 19th I had a specimen of *S. convolvuli* brought to me which had been found clinging to the wall of a house here.—EDWARD RANSOM; Sudbury, Suffolk, September, 1897.

SPHINX CONVOLVULI.—On Friday, Sept. 3rd, two fine specimens of *S. convolvuli* were observed in the garden here. They were flying, about 7.30 p.m., over a bed of tobacco plant (*Nicotiana affinis*).—M. ALDERSON; Park House, Worksop, Notts.

SPHINX CONVOLVULI IN THE ISLES OF SCILLY.—While staying in the Isles of Scilly during the month of August and the first few days of September, my friend Mr. Whiffen and myself took seventeen specimens of *S. convolvuli* in rather worn condition, hovering over flowers.—B. W. ADKIN; Brandon House, Morden Hill, Lewisham, S.E., September, 1897.

NOTE ON STAUROPUS FAGI.—I have a nice lot of larvæ of *S. fagi* from ova deposited on Aug. 5th. These commenced to hatch on Aug. 13th, and were only eight days in the egg state. The spring brood were sixteen days in the egg stage.—W. E. BUTLER; Hayling House, Reading, Sept. 11th, 1897.

LARVA OF EUPITHECIA PUMILATA FEEDING ON HOLLY FLOWERS.—When at Oxshott, on Whit Monday last, I obtained, among holly flowers, a few larvæ of a species of *Eupithecia* which I did not recognize at the time, but on June 26th and three following days they produced specimens of *E. pumilata*. I know that the larva of this species will feed on the blossom of many kinds of plants, but I do not remember to have seen any record of its having been found on the flowers of this shrub.—RICHARD SOUTH; 100, Ritherdon Road, Upper Tooting, S.W.

NOTE ON ACIDALIA INORNATA.—On July 6th last I captured a female *A. inornata* at Oxshott, and she deposited about forty eggs. The larvæ

hatched in due course and were supplied with knotgrass. About two-thirds of the number fed up rapidly and pupated, the first imago appearing on Sept. 4th. The remainder of the larvæ evidently intended to hybernate from the first, as they were only about half grown when the major portion of the brood pupated, and they have not increased at all in size since that time. So far as I can see they do not eat the fresh food with which they are provided, but seem to prefer the withered sprays that are allowed to remain on the suface of the earth in their cage. At the present time they appear active enough, as whenever the cover of their cage is removed, and the *débris* at the bottom gently blown upon, each individual at once indicates his presence by a quick swaying movement of the anterior segments.—RICHARD SOUTH; 100, Ritherdon Road, Upper Tooting, S.W.

ABRAXAS GROSSULARIATA, VAR.—The most interesting form of *A. grossulariata* I have seen this year is one I took here, in which the usual orange band on the fore wings is diffused towards the anal angle. The band is continued on the hind wings, being very distinct on the inner margins. In these respects the moth bears a faint resemblance to *A. sylvata*.—ALFRED SICH; Villa Amalinda, Burlington Lane, Chiswick, July 5th, 1897.

FOOD-PLANTS OF PLUSIA GAMMA AND HADENA TRIFOLII.—Larvæ of *Plusia gamma* have been noted this season feeding on a large variety of plants. I had three or four that were found on lime. Mr. W. E. Butler informs me that he has observed them feeding on the pods of scarlet runner beans. Mr. Butler also notes larvæ of *Hadena trifolii* (*chenopodii*) eating the young leaves of onions.—R. S.

PLUSIA MONETA IN SURREY.—I took two specimens of *P. moneta* in a garden here at the end of July, and about the same time a specimen of *Smerinthus populi* in pretty good condition.—J. B. MORRIS; Maldon House, Maldon Road, Wallington, Surrey.

EUGONIA (ENNOMOS) AUTUMNARIA (ALNIARIA) AT CHICHESTER.—I have to record the capture of a male specimen of *Eugonia autumnaria* (*alniaria*) here on Sept. 5th. It was taken settled in the road in the daytime, by the Rev. H. Housman, who kindly gave it alive to me.—JOSEPH ANDERSON, Jun.; Chichester.

NOTES FROM SUSSEX.—At the end of August last I beat a full-fed larva of *Stauropus fagi* from hazel, which in a few days spun up in the cage between two oak leaves. The Diurni appear to have been by no means plentiful about here this season. Sugar, however, has proved very attractive, and the commoner Noctuæ I have noticed in enormous numbers.—WILFRID J. ANDREW; Hawthorn Villa, West Hoathly, Sussex, Sept. 17th, 1897.

ENTOMOLOGY IN MERIONETHSHIRE (continued from page 248).—

Neuroptera-Odonata: Dragonflies on the whole were unusually scarce, though diligently sought for, only six species being met with. *Cordulegaster annulatus* occurred sparingly, both at Barmouth and Tan-y-bwlch; I did not encounter it elsewhere. *Orthetrum cærulescens* was fairly plentiful at Tan-y-bwlch, but only one came under notice at Barmouth. All the examples taken were females, with the exception of a solitary male. A single *Æschna grandis* was noticed flying over the heather at Tan-y-bwlch. *Pyrrhosoma minium* and *Agrion puella* swarmed at Tan-y-bwlch, but were in much less numbers at Barmouth.

Coleoptera: Several species of Elateridæ and Brachelytra were found washed up by the tide, the names of which I have not, so far, definitely ascertained. *Timarcha lævigata* was common, crawling over mountain paths at Barmouth.—AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, September, 1897.

COLLECTING AT SWANAGE, DORSET.—Butterflies seem to have been very plentiful this year, some species being more than usually abundant. The following species were found during a five weeks' stay, Aug. 5th to Sept. 9th:—*Pieris brassicæ*, *P. rapæ*, *P. napi*, *Colias edusa* (one), *Argynnis aglaia*, *Vanessa urticæ*, *V. atalanta* (very abundant; twenty-five were counted on one rubbish-heap), *Pyrameis cardui* (plentiful; I took four in about five minutes one morning), *Melanargia galatea* (fairly common, but rubbed), *Epinephile ianira*, *E. tithonus*, *Satyrus* (*Hipparchia*) *semele*, *Cœnonympha pamphilus*, *Pararge* (*Satyrus*) *megæra* (all common), *Thecla quercus* (two), *Lycæna astrarche* (*agestis*), *L. icarus* (both common), *L. bellargus*, *L. corydon* (common, but local), *L. minima* (only two or three), *L. argiolus*, *Polyommatus phlæas*, *Hesperia thaumas* (a few worn specimens), *H. actæon* (plentiful). Not many moths were obtained, but *Macroglossa stellatarum* was abundant, at the flowers of geranium mostly, and also found at fuchsia. *Plusia gamma* swarmed everywhere, in fields, gardens, &c., coming especially to geranium and fuchsia. *Zygæna filipendulæ* was common; also *Aspilates ochrearia* and *Phlogophora meticulosa*. Two or three *Bombyx* (*Lasiocampa*) *quercus* were seen, one *Bryophila muralis* on a pine-tree, and one *Amphipyra pyramidea*. Larvæ of *P. brassicæ* and *P. rapæ* on nasturtium, *Euchelia jacobææ* on ragwort, and *Phalera bucephala* were common; and three larvæ of *Sphinx ligustri* were obtained.—E. V. HALL; 4, The Avenue, Brondesbury, N.W.

RHOPALOCERA AT LLANDUDNO.—On Aug. 25th I revisited an old collecting-ground on the Conway Shore, Llandudno, where I remembered taking insects in 1884. Thermometer 75°, sunshine, blue sky with cumulus clouds, gentle breeze, sea calm. The ground, a portion of which had been used for golfing since my previous captures, was sandy, covered with thistles, teasels, and low herbage. The first insect I noticed was *Lycæna icarus*, a pair of which, evidently not recognizing an entomologist, fluttered round me repeatedly as I stood. *Satyrus* (*Hipparchia*) *semele* was abundant, in all conditions, from the perfect specimen to the bleached and battered veteran. *Epinephele ianira*, which formerly I had observed abundantly at this collecting-ground, was conspicuously absent, nor were any Vanessas seen, although *V. cardui*, *V. io*, and *V. urticæ* had all occurred here in 1884. One or two specimens of a Noctuid were dashing about (probably *Plusia gamma*, but too active to be identified with certainty). Other butterflies seen were *Pararge* (*Lasiommata*) *megæra*, *Cœnonympha pamphilus*, *Polyommatus phlæas*, and *Lycæna astrarche* (*agestis*).—GRAHAM RENSHAW; Vale Bridge House, Vale, Cheshire.

DRAGONFLIES AROUND BIRMINGHAM IN 1897.—During the past season Odonata were very plentiful in point of numbers, but a poor selection of species was met with. The best locality proved to be a large pond at Earlswood (nine miles distant from the city), over which, on a hot and bright day, enormous numbers of these insects were to be seen. About this pond *Libellula depressa* was the commonest species, though elsewhere it only occurs sparingly. *L. quadrimaculata* was scarce, being only

observed here twice, and once near Hockley Heath, a few miles distant. *Æschna grandis* undoubtedly was the commonest of the larger species, it being met with in a variety of situations throughout the district; it was especially abundant over the commons in Sutton Park (N. Warwickshire), where also *Æ. cyanea* was plentiful. This last species is sometimes seen careering wildly about the streets of Birmingham. *Cordulegaster annulatus*, though usually considered a local insect, is widely distributed over this district, but never in considerable numbers. *Calopteryx splendens* was plentiful amongst rank herbage about a brook at Hockley Heath. *C. virgo* is also common, but I did not meet with it this year. *Pyrrhosoma minium* and its companion *Agrion puella* were both about in immense numbers. On several occasions *Æschna grandis* was observed ovipositing, sometimes on the leaf of a water-lily, and at other times thrusting its abdomen some distance below the surface of the water, the eggs on this occasion being attached to the stem of the plant. Once I noticed the insect fasten its eggs under the leaf of the plant; during this process it almost entirely submerged itself, While oviposition was taking place the female always contracted her long slender abdomen into the form of a loop, the reverse to *Libellula depressa*, the structure of whose abdomen seems only adapted to be kept fairly rigid; being broad and flat, it certainly does not admit of such extreme contraction.—AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, September, 1897.

CAPTURES IN ESSEX.—The following is a list of Lepidoptera that I have taken during the present season. Unless otherwise stated, Benfleet is the locality:—*Leucania obsoleta*, June 24th, at sugar. *Ditula hartmanniana*, June 26th, several on fences near osiers. *Elachista triatomella*, June 26th, flying over meadow-grass, and settled on the railway fence. *Penthina gentiana*, June 27th, several bred from teasels. *Aplecta advena*, June 28th, at sugar. *Ceratophora inornatella*, June 28th, a few on sugared reeds. *Cnephasia politana*, June 28th, netted. *Coleophora anatipennella*, June 30th, one or two on the wing. *Acontia luctuosa*, June 30th, 10.45 p.m., flying round one of the lamps at Benfleet station. *Antithesia salicella*, July 3rd; this fine tortrix common among osiers. I don't know whether this species or *P. curtisellus* more closely resembles the excrement of a bird; when at rest on a fence the likeness in each case is remarkable. *Agrotis corticea*, July 3rd, at sugar, a rare moth in these parts. *Leucoma salicis*, July 3rd—Aug. 4th, at gas-lamps, Southend. *Eupœcilia angustana*, July 6th, at rest. *Orthosia upsilon*, July 9th, at sugared blackthorn, but osiers quite near. *Rhodophœa advenella*, July 29th, at light, Benfleet Station. *Nonagria neurica*, July 31st and Aug. 7th, at sugar. *N. geminipuncta*, Aug. 14th, bred, and taken at sugar. *Homœosoma senecionis*, Aug. 5th, a few from larvæ collected at Leigh July 12th. *Apodia bifractella* (Aug. 15th), and *Ptocheuusa inopella* (Aug. 18th), on heads of *Inula* at Leigh. *Plusia festucæ*, July 18th, at sugar. The season here has been a good one, not equal to the last, but still better than that experienced in many districts.—F. G. WHITTLE: 3, Marine Avenue, Southend, Sept. 1st, 1897.

[*Homœosoma senecionis*, Vaughan, is now generally considered to be synonymous with *H. cretacella*, Rössler; *vide* Entom. xxiii. 365.—ED.]

SOCIETIES.

South London Entomological and Natural History Society.—*July 22nd*, 1897.—Mr. A. W. Dennis in the chair. Mr. Ashdown exhibited a living specimen of the rare and local Longicorn, *Oberea oculata*, taken at Wicken Fen. Mr. Kedgeley sent for exhibition a specimen of the dragonfly *Æschna cyanea*, which had been taken in the Borough on July 18th.

August 12th.—Mr. R. Adkin, F.E.S., President, in the chair. Mr. McArthur exhibited a fine bred series of *Toxocampa craccæ* from North Devon. Mr. Edwards, young larvæ of *Callimorpha hera*, which he had just received from the French Alps, where the imagines absolutely swarmed. Mr. J. N. Smith, on behalf of Mr. Fitzgerald, a remarkably smoky variety of *Melanippe montanata*, one of a pair taken at the same time and place. Mr. Tolhurst, the curious telescopic larvæ of *Eristalis tenax* from a tank of foul water in his garden. Mr. West, of Greenwich, specimens of the Hemipteron *Atractotomus mali*, which he had taken on whitethorn at Lewisham. Mr. Ficklin, larvæ of *Dianthœcia nana* from the Land's End. Mr. South, two bred specimens of *Peronea permutana* from Eastbourne which differed very considerably from the Wallasey type. Mr. Adkin, a small brood of *Abraxas grossulariata* which exhibited none of the peculiarities of the female which deposited the ova.

August 26th.—The President in the chair. Mr. Tutt exhibited the egg of *Polyommatus corydon*, which had never been previously described, and remarked on its beautiful reticulated appearance; a living *Mantis* from Aix-les-Bains, which had fed ravenously on cockroaches; a *Tipula* with beautifully marked wings; and specimens of an Orthopteron which were abundant and active on the wing about 9 a.m. near Susa, and remarked on the protective coloration of the latter species. On behalf of Mr. Tuck, of Bury St. Edmunds, he also exhibited a nest of *Vespa rufa* which had been attacked by the larvæ of *Aphomia sociella*, and which was about a foot deep in a bank; part of the nest of *Bombus lapidarius* attacked by the same species, and which had been taken from a rat's hole in a pigstye; and further a nest of *Bombus latreillellus*, similarly attacked, taken from a mouse's hole in a pasture. They were all taken during the few previous days. Mr. Adkin, series of *Bryophila muralis* (*glandifera*) and *B. perla* from Poole, with series from Eastbourne for comparison. Mr. McArthur, specimens of *Larentia salicata* from North Devon, small and dark compared with those from other localities; a second brood specimen of *Smerinthus populi;* and a series of good varieties of *A. grossulariata* bred this year.

September 9th.—The President in the chair. Mr. Spindler exhibited a remarkable variety of *Epinephele tithonus*, in which the whole of the dark markings were absent, while the fulvous colour was of the normal tint. It was taken at Luggershall, Sussex. Mr. South, several unusually dark forms of *Spilosoma menthastri*, descendants of Moray parents, reared in London. Mr. Turner, an unusually grey specimen of *Mamestra abjecta* taken in the Greenwich marshes; a small red form of *Agrotis tritici* from Woolmer Forest, Hants; series of under sides of

*Enodia hyperanthus** from Carlisle and Chattenden to show the contrast in the ground colour, the former being of a grey appearance, while the latter were deep and rich; a larva of *Heterogenea limacodes* from Westerham; and larvæ of *Acidalia immorata* from Alpine ova. Referring to the latter, he remarked upon the undoubted *Acidalia*-like habits and appearance of the larvæ, and said that they fed readily upon knotgrass. Mr. West, of Greenwich, specimens of the local Hemipteron, *Dictyonota fuliginosa*, taken on broom at Plumstead. Mr. Adkin, series of *Satyrus semele*, from Eastbourne and Bournemouth, for comparison, with examples set to show their natural resting positions on the ground. Mr. Tutt remarked that allied continental species had precisely the same habits. Mr. Lucas, specimens and drawings of the scarce dragonfly *Agrion mercuriale*, which he had taken in the New Forest. Mr. Dennis, under the microscope, ova of both *Polyommatus corydon* and *Plebius ægon*, the former of which had not yet been described. Mr. Tutt, a cabinet drawer containing a long series of *Erebia nerine* and its near allies, together with photographs of the famous Mendelstrasse, in illustration of a paper, entitled, "A Gregarious Butterfly, *Erebia nerine*, a Reminiscence of the Mendelstrasse, with Notes on the Lepidoptera of the Serpents of the Mendelstrasse," which he read.—Hy. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*August 16th*, 1897.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. Bradley showed *Æschna grandis* from Sutton, and said that it was quite unusually common there this year both in the park and in his garden; also *Molophilus murinus* from his garden, where he had taken a fair series this year, though it had not occurred there before. Mr. R. H. Martineau showed larvæ, pupæ, and imagines of *Authophora furcata*, to illustrate its life-history; also *Salius fuscus* from Wyre Forest, with a large spider it had captured; *Mimesa bicolor*, male and female, from Coleshill; and *Ammophila sabulosa* from Wyre Forest. He also said, *à propos* of a note by Mr. E. Saunders in the July number of the Ent. Mo. Mag. on "Muscular Energy in a *Tipula* Leg after Death," that he had watched a dissevered leg of a harvest bug (Acarinæ) move spasmodically round a plate for thirty-five minutes. He also stated that he once removed the body from a living wasp, and then supplied it with liquid food; it drank up the food until it had deposited a large bead of it behind. He then attached a cork body to it, and the insect flew across the room, though of course badly and not straight, as the balance could not be restored. Mr. J. W. Moore showed a little lot of Lepidoptera from the Fens, where he had collected them last Whitsuntide, which included *Senta maritima* with var. *wismariensis*, a fine series of *Leucania obsoleta*, a single *Tapinostola elymi*, *Acronycta leporina*, *Lithostege griseata*, &c.; also, from Scotland, *Arctia fuliginosa*, bred *Hadena pisi* which were small, dark, and more marbled than usual,

* It is quite possible that *hyperanthus* is not strictly congeneric with *Epinephele ianira* and *E. tithonus*, but still it is probably more correct to keep it in that genus than to place it in *Enodia*. Scudder (Butt. New Engl. i. p. 176), in his remarks on *Enodia*, states that the genus "is confined to eastern North America, where it is represented by a single species," *i. e. E. portlandica*, Fab., = *andromachd*, Hübn., a very different looking insect to the European *E. hyperanthus*.—Ed.

an *Acronycta myricæ;* also a series of *Agrophila sulphuralis* from Tuddenham. Mr. G. T. Bethune-Baker exhibited two drawers from his collection containing the genus *Aporia*, and parts of the genera *Parnassius* and *Pieris*. He pointed out how naturally *Parnassius* runs into *Aporia* through *mnemosyne*, in which all the red and some of the markings have gone, and *stubbendorfii*, in which the dark colour is nearly confined to the nervures; also that *Aporia* runs into *Pieris* through *A. hippia* and *P. melete*.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

RECENT LITERATURE.

Publications Issued by U.S. Department of Agriculture.—Entomology.

The Asparagus Beetles, by F. H. CHITTENDEN.—The introduction and subsequent spreading of *Crioceris asparagi*, L., and *C. duodecempunctata*, L., in America are referred to. In addition to its natural checks, which appear to be numerous, various simple methods are discussed for keeping the commoner species, *C. asparagi*, under control; the other species does not seem to have done any great damage at present.

Some little-known Insects affecting Stored Vegetable Products: a collection of articles detailing certain original observations made upon insects of this class. By F. H. CHITTENDEN.—Contains information concerning *Ephestia cahiritella*, Zell. = *passulella*, Barr., and *E. elutella*, both of which are said to feed on chocolate, either in its raw state or on the manufactured article. Other species of Lepidoptera and Coleoptera injurious to dried fruits, grain, flour, and various stored products are dealt with. There is also an article on the parasites of *Ephestia kühniella* and *Plodia interpunctella*.

The San Jose Scale and its Nearest Allies: a brief consideration of the characters which distinguish these closely related injurious scale insects. By T. D. A. COCKERELL.

Insect Control in California. By C. L. MARLATT.

General Index to the Seven Volumes of Insect Life, 1888–1895. This elaborate compilation enables one to find what one requires in the volumes without trouble.

OBITUARY.—We regret to announce the death of the Rev. ANDREW MATTHEWS, rector of Gumley. He was born on June 18th, 1815; and died on September 14th last. In 1872 Mr. Matthews published the first volume of 'Trichopterygia illustrata et descripta,' with thirty-one plates drawn by himself; and in his eightieth year he completed a second volume, also illustrated by his own hand: this is now with the publisher. Among his other works are papers on the genera *Hydroscapha*, *Amblyopinus*, *Myllaena;* and synopses of the Trichopterygidæ of Europe and North America. He also described the species of his particular group of Coleoptera in 'Biologia Centrali Americana.' We understand that after the publication of the first volume of Trichopterygidæ he was offered the Fellowship of the Royal Society, but declined the honour.

FIG. 1.

FIG. 2.

FIG. 3.

W. J. Lucas del.

FIG. 1.—*Agrion mercuriale.* *a*, male imago (twice natural size). *b*, female imago (twice natural size.) *c*, distinctive markings on first and second segments of abdomen (more highly magnified.)

FIG. 2.—Anax formosus. Full-grown nymph (nat. size.)

Fig. 3.—Calopteryx splendens. Full-grown nymph (twice nat. size.)

THE ENTOMOLOGIST

VOL. XXX.] NOVEMBER, 1897. [No. 414.

DRAGONFLIES IN 1897.

BY W. J. LUCAS, B.A.

(PLATE I.)

WHILE lepidopterists have been complaining of the uselessness of sugaring and larvæ-hunting, and of the paucity of insects generally, the dragonfly collector has had his hands full, though perhaps the scarcer species have not crossed his path so frequently as he would wish. Owing, however, to the cold weather in the latter part of the spring, the season for the perfect insects was somewhat late in commencing, and my first capture of *Libellula quadrimaculata* did not take place till May 9th, whereas in 1894 I secured a specimen as early as April 25th; and though *Pyrrhosoma minium* was taken on May 2nd at the Black Pond, near Esher, it did not become general there till after the middle of the month.

During the season I have been able to sketch and describe the eggs of about a quarter of the British species of Dragonflies, and although perhaps the material thus obtained is scarcely sufficient to allow one to make many general statements, yet the following remarks will probably need but little subsequent modification. In colour the eggs are very pale yellowish white, which in some cases turns to reddish brown after they have been for a time in the water. They are semitransparent, and closely resemble ovules or very young seeds of a plant, their contents being granular, as if protoplasmic, and perhaps containing globules of an oily nature. They all, or nearly all, still further resemble ovules in possessing a little pedicel at one end. In shape there is some variation. The Libelluline, Corduliine probably, and Corduligasterine families have eggs whose section is elliptical, oval, or pear-shaped, the two axes not differing greatly

in length, the major being in *Platetrum depressum* about three-quarters of a millimetre. With the Æschnines, however, the egg is much longer than broad, being, in fact, a cylinder with rounded ends—in *Anax formosus* nearly 2 mm. long and one-third of a millimetre broad. I have not seen any Calopterygine eggs, but those of two Agrionines—*Agrion cyathigerum* and *Pyrrhosoma tenellum*—were very similar to one another, and closely resembled those of the Æschnines, being of course smaller, though large for the insect; they were not quite cylindrical, but the transverse axis increased a little in length towards the end bearing the pedicel. It would seem that the broad-bodied group and their relatives have broad eggs, while the decidedly long-bodied groups have elongated ones. A dragonfly like *Anax formosus* must produce a tremendous number of eggs, for when about to lay the body of the female contains little else than ova. No doubt this is an advantageous provision of nature, for the very young nymphs, and possibly the eggs also, must find many enemies in their watery home. In the case of several species I have noticed that the female drops the eggs at random into the water, often being accompanied by the male, which, with its anal appendages, clasps her by the thorax, apparently with the object of supporting her on the wing while she is ovipositing.

As regards larva-nymphs, by various means I was able to identify several during the season. From the Black Pond was obtained a nymph, which I suspected to be *Cordulia ænea*, but about which I could not feel quite certain, as it at first sight closely resembled the nymph of *Libellula quadrimaculata*. The discovery of one or two skins, that clearly belonged to the same species, in close proximity to newly-emerged imagines of *C. ænea*, made me confident that I was right in my surmise, and the breeding of a specimen on May 21st from a nymph obtained near Byfleet enabled me to identify the species with certainty. It may be distinguished from *L. quadrimaculata* and *Platetrum depressum*, both of which broad-bodied nymphs it closely resembles in general shape, by the greater length and slenderness of the legs, by the pale lateral markings on the abdomen, and by the shape of the ninth and tenth segments, which end abruptly and do not taper off gradually to the anal appendages. On May 16th, at the Black Pond, I found a *C. ænea* so lately emerged that its wings were not inflated, transfixed through the head by a spike of dry grass. The insect was alive, and the accident had probably been caused by the wind, for the same day I took a living female floating on the water.

Although I bred *P. depressum* on June 14th, and had during a previous season bred *L. quadrimaculata*, I am afraid I could not undertake from their general appearance to distinguish between the nymphs. The former appears to have stouter legs, with which it burrows easily in the mud, and it should, I think,

be sought there; *L. quadrimaculata*, I believe it may be safely asserted, will always be found amongst weeds.

A male *Agrion pulchellum* put in an appearance on May 22nd, but I was not expecting to breed the species, and the nymph-case after the emergence was so collapsed that little could be made of it.

On June 7th, near Wisley in Surrey, I found a number of nymph-cases of *Calopteryx splendens*. This nymph cannot possibly be confused with any other except its congener, *C. virgo*, which, however, it certainly does very closely resemble. But as I have never met with *C. virgo* anywhere in the neighbourhood, while *C. splendens* is remarkably common, its identification was a matter of certainty. It possesses three caudal lamellæ, as do the Agrionines, but the outer ones are three-edged instead of flat, and the nymph itself is very much larger than any of that family. Besides this the triangular head and extremely long basal joint of the antennæ are also conspicuous points for distinguishing it from anything except *C. virgo*. Of those found on June 7th, some were on reeds and others on wooden walls. In the latter case they must have crossed a canal-path and then climbed several feet up the wall before disclosing the imago. All were a good deal incrusted with mud. This insect, which is of a general brownish colour, is shown in the Plate (fig. 3), twice natural size. Singularly enough, I received from Mr. Bell-Marley, on Aug. 3rd, a nymph (apparently of *Æschna cyanea*), which, he says, must have crawled ten yards or more out of the water, and then mounted a high railing before the imago emerged. He noticed the absence of pond-reeds, and this probably was the cause of the expedition.

Collecting at the Black Pond on June 17th, I came across an empty nymph of *Anax formosus*, whereupon a young friend, W. Prest, who was with me, searched carefully, and found a fair number of nearly perfect cases at the bases of the clumps of rushes: others he obtained in the same manner on the 21st. In this instance, though no imagines were found near the empty cases, there could have been no doubt as to the identification, even if the nymph had been unknown to me, for no other dragonfly at all commensurate with *A. formosus* was then on the wing at the Pond. It is represented of the natural size at fig. 2 in the Plate, and may be described as follows:—In length it is 54 mm., and in breadth 10 mm. The colouring of the empty case is a pale yellowish brown; along the back is a much darker stripe, which is almost obliterated on the posterior part of each segment, and is traversed down the centre by a pale streak. Most of the abdominal segments have eight small dark depressions, and the sides of the abdomen, as well as the thorax, are relieved by a number of pale streaks. The head is flat, while the eyes are large and rounded, and separated by almost a straight line from

the occiput, the posterior margin of which is also almost straight. The two thoracic spiracles are uncovered and conspicuous. The mask is rather slender and of good length; it broadens somewhat anteriorly, and the inner hook is cut square, while the outer moveable one is long and sharp. Of the leg-base processes, the hinder one is largest, and a right angle is enclosed between them. The legs, which are fairly stout, are marked with several rather dark rings. In front the abdomen is slightly contracted, but it expands posteriorly, and then contracts again. Segments 7, 8, and 9 have long lateral spines, that on the ninth being almost as long as the tenth segment. The lower abdominal appendages are long and sharp, the middle one is rather shorter and notched at the extremity, while the superior laterals are not half as long as the lower ones. The male projection on the under surface of segment 9 is very small, but that of the female is about two-thirds the length of the segment.

On July 18th, when *Sympetrum scoticum* was just emerging at the Black Pond, I succeeded in securing a few nymph-cases by looking for the very recently-emerged imagines, and then searching for the nymph-skin on the rushes or reeds below it. Except as a result of breeding, this is usually the most satisfactory method of obtaining nymph-cases whose identity is undoubted; in the case of the Agrionines, however, the skins are usually so ethereal that they are of little use. *S. scoticum* is rather elegant in form, and closely resembles a miniature *C. ænea*, and might be mistaken for that nymph, only that *C. ænea* of the same size would be almost or quite innocent of wing-cases.

Some nymphs of *Sympetrum striolatum*, which, as mentioned earlier in this volume (p. 30), hatched out about Oct. 18th, 1896, are at present, I am afraid, represented by a single specimen, but that is now (Oct. 1st) about 16 mm. in length, and certainly will not take two more seasons to reach its full size. It will, I should say, if still living, produce an imago next July, and that although it has not had a plentiful supply of food. It would almost seem that a well-fed nymph might become mature the season following the laying of the egg, instead of taking three years as is sometimes supposed; but it is just possible that out of doors the eggs may not hatch till the following spring.

Turning now to the perfect insects. The first on the list, *Platetrum depressum*, was met with on two occasions only—at Longcross, near Chertsey, on June 6th, when I noticed a female ovipositing by dipping her abdomen in the water, apparently quite at random, and at the Black Pond on June 13th. *Libellula quadrimaculata* did not appear to be quite so common as usual. I found it between May 9th and July 25th at the Black Pond, the Basingstoke Canal near Byfleet, and Wisley Pond. In the

New Forest, almost wherever I went between Aug. 1st and 14th, *Orthetrum cærulescens* was very common. The other species of the genus, *O. cancellatum*, I met with at Wisley Pond on June 22nd, when it was rather fresh upon the wing. *Sympetrum striolatum* was another very common species in the New Forest at the beginning of August, and I often noticed them in pairs, the females ovipositing by dipping their abdomen into the water, as in the case of *P. depressum*, and apparently quite as aimlessly. This species was also seen or taken in several spots around Oxford towards the end of August. It was common at Wisley and Black Ponds in Surrey in September, and several specimens were observed at the last locality as late as Oct. 17th. *Sympetrum scoticum* was first noticed at the Black Pond on July 18th, and was then in good numbers. It was still on the wing in considerable plenty at the same place on Oct. 17th. I noticed a few at Wisley Pond on Aug. 16th, and a pair on Sept. 11th. In the New Forest I came across a few on Aug. 10th, in a boggy spot about a couple of miles from Brockenhurst; but there apparently are not many in the Forest, at any rate in the southern part. One or two specimens of this species had a tendency to saffron suffusion of the fore wings, not an uncommon form of variation amongst the Libelluline dragonflies.

Cordulia ænea was met with on several occasions—at the Black Pond on May 16th, May 23rd, and June 13th; over the canal, near Byfleet, on June 7th; and at Wisley Pond on June 23rd.

Between Aug. 1st and 14th *Cordulegaster annulatus* was very common in the New Forest, generally flying low along the streams. Large numbers of males might have been taken, but I noticed only one female, which was captured as she was ovipositing.

In Surrey, *Anax formosus*, though certainly very difficult to capture, is not so uncommon an insect as is often supposed, and it cannot be confused with any other dragonfly, for there are none on the wing during its time of flight that it at all resembles. Good numbers were out at the Black Pond on June 13th, and several were about still on July 25th. On July 18th I took a female there which had a blue abdomen, somewhat like the one figured by Charpentier;* but all other females I have taken have been quite green. On July 25th I caught a male which I had just observed catch a *S. scoticum*. This it let go in the net. I then, while holding *formosus* by the wings, offered it another *scoticum*, which it seized and held with its legs (not its jaw). After being bitten *scoticum* was let fall. I again offered the *scoticum*, which (except the wings and part of the abdomen) was devoured with gusto. I also saw this species at Wisley Pond on

* 'Libellulinæ europææ,' pl. 45, fig. 1.

June 22nd and 23rd, and took a male on Bookham Common on July 3rd. *Brachytron pratense* was noticed on June 7th at the canal near Byfleet, and on June 23rd at Wisley Pond.

Though a good many Æschnas were seen, I took but two during the season, an early female *Æ. cyanea* near Esher on July 25th, and a female *Æ. mixta* at Wisley Pond on Sept. 11th. On the latter date I had been watching for some time, in one corner of the large pond, a small *Æschna*, which I took to be *mixta*, especially as it flew rather high, a habit which rightly or wrongly I have associated with this insect. Other Æschnas went up to it, but left it alone. Presently it went away towards the smaller pond. Later I went there, and saw the same insect, or another somewhat like it, flying about some bushes. After a time it settled, whereupon I secured it, and sure enough it was a splendid female *mixta*, a new record for Wisley, and my second capture of the species, my first of the female. Strangely enough, a day or two later Mr. M. Burr sent me a male of the same species, which he had knocked down at East Grinstead on Sept. 12th with a tennis-racket—an ignominious method of capture, considering the patient watching that is usually required before securing an insect belonging to the genus *Æschna*. The last *Æschna* seen though I could not identify it, was on Oct. 10th at Esher.

Calopteryx virgo was still fairly common in many places in the New Forest, between Aug. 1st and 14th, though its real season was over. *C. splendens* swarmed in many places in Surrey. I took it between June 7th and July 11th, principally along the canals and rivers; only stragglers were taken at the Black Pond and Wisley Pond. On Aug. 19th one female was taken on the bank of the Thames—in Berks, at Eynsham, a few miles from Oxford.

Lestes sponsa was taken over a tiny, almost dried-up pond near Brockenhurst on Aug. 13th, at Wisley Pond on Aug. 16th and Sept. 11th, and two were captured on a cool windy day (Sept. 4th) on Winchelsea marshes.

But six *Platycnemis pennipes* were taken near Newark Abbey, in Surrey, on July 11th, but the species was very common in some places in the New Forest in the beginning of August, and I found a few by the Thames side in Berks, near Eynsham, on Aug. 19th.

Between June 7th and Aug. 19th, *Ischnura elegans* was noticed in several localities: Canal at Byfleet; near Newark Abbey, Surrey; in the New Forest; at Wisley Pond; and in Berks, near Eynsham.

Agrion puella was not noticed till May 23rd, but it had a long period, for the last to be noted occurred on Aug. 16th. Localities were the Black Pond, not very common; Longcross, Surrey;

canal, near Byfleet; Wisley Pond; Bookham Common; near Newark Abbey; near Brockenhurst. *A. cyathigerum* was on the wing still longer than *A. puella*, for the first was seen on May 16th, and the last on Sept. 26th, the localities being Black Pond, very common; canal, near Byfleet; Bookham Common; New Forest. Charpentier* figures the female blue; but, though I have taken several blue females, most are greenish in ground colour. The spot on the second segment of the male, which is usually elliptical, has not seldom a point anteriorly, and in one case was reduced to a thin transverse streak detached from the circlet as the spot often is when normal in shape. *A. pulchellum* was fairly common in one restricted spot by the side of the canal, near Byfleet, on June 7th and July 11th. On Aug. 3rd I found *A. mercuriale* fairly common along one of the streams in the New Forest. In several cases they were flying in pairs, but the majority were males. A few days later I saw no females at all. On the wing this insect closely resembles *A. puella*, *A. cyathigerum*, or *A. pulchellum*, but it is decidedly smaller (see Plate, fig. 1). The males of this species may be at once recognised by the very distinctive mark on the second segment, an enlarged drawing of which is shown in the figure. The females are dark, like those of *A. puella* or *A. cyathigerum*.

Between May 2nd and Aug. 5th, *Pyrrhosoma minium* was met with in a number of localities—Black Pond; Longcross, near Chertsey; canal, near Byfleet; near Newark Abbey; and one or two places in the New Forest. Specimens with a bunch of acari attached to the under surface of the thorax were taken at Longcross. *P. tenellum* was as usual later than its congener. It was on the wing from June 13th till Sept. 11th, and was noticed at the Black Pond in large numbers, and in a few localities in the New Forest.

Erythromma najas, a very local dragonfly, swarmed in a somewhat restricted locality at the canal, near Byfleet, on June 7th. Some were taken at Wisley Pond on June 23rd, and, strange to say, a single specimen, a male, was taken at rest on the evening of June 17th at the Black Pond, this making yet another new record for that prolific locality.

21, Knight's Park, Oct. 19th, 1897.

* 'Libellulinæ europææ,' pl. 42, fig. 1.

CHORTODES MORRISII, Dale MSS., Morris = *C. BONDII*, Knaggs.

By J. W. Tutt, F.E.S.

I am sorry to disagree with so eminent a lepidopterist as Dr. Knaggs, but as I long ago came independently to precisely the same conclusion as Mr. Meyrick as to *bondii*, Knaggs, being simply a synonym of *morrisii*, Morris (or Dale), and as I have had reason occasionally to adversely criticise some of Mr. Meyrick's work, I think it only just to say plainly that I agree with him absolutely on this point, and disagree just as absolutely with Dr. Knaggs.

So far as this is a matter of fact and not of sentiment, I would ask any lepidopterist interested in the subject to compare carefully Humphrey and Westwood's figure, which Dr. Knaggs dismisses as "an insect with narrow pointed wings, purporting to represent *morrisii*," with a good series of the Folkestone insect, and say whether they are not identical, and again, if they think not, I would ask what other British insect the figure represents?

The fact that the Rev. F. O. Morris, in 1872, forgot something that he had done in 1837, thirty-five years before, is not wonderful. To say the least, Mr. Morris was not a deeply scientific entomologist. Besides, to what other *Acosmetia* (in the old sense) are the opening words of his own description, "Pale straw-colour approaching to silvery white," &c., applicable? There were many things entomological, if we take Morris's book as a standard, of which that author was apparently unaware. In fact, he seems to have been much more "unaware" than he was "aware" of some of the subjects of which he treated, but that does not alter the fact that Charmouth, where the original *morrisii* were captured, is, next to Folkestone, the best known locality for *bondii*. I do not wish to quibble about Charmouth and Lyme Regis and their respective positions. I take the report of Mr. Goss as to its distribution as the important factor in this direction, and most working lepidopterists know that the Lyme Regis locality has long since been found to extend almost to Charmouth.

There are many important things relating to the enquiries that have been made into the synonymy of this species of which Dr. Knaggs does not seem to be aware. Some six years ago I thoroughly sifted the matter, and wrote as follows ('British Noctuæ and their Varieties,' vol. iv. p. 97):—"This (*morrisii*) certainly is not a pale variety of *arcuosa*. The original description and notes relating to *morrisii*, copied from Humphrey and Westwood, are as follows: '*Acosmetia morrisii*, Dale ('Naturalist,' *ii. p. 88*, and Errata): This species measures about an inch in

the expanse of the fore wings, which, as well as the hind wings and body, are entirely of a pale whitish colour; the costa of the fore wings slightly brownish, &c. Named by Mr. Dale after the Rev. F. O. Morris, who discovered it. It has been taken several times on the East Sea Cliff, Charmouth, Dorset, at the beginning of July. We are indebted to Beverley R. Morris, Esq., for the loan of two specimens differing somewhat in size' ('British Moths,' p. 243, pl. liv. fig. 12). The probability of this being identical with *bondii*, on an examination of Humphrey and Westwood's figure, the hind wings of which are strikingly those of *bondii*, was immediately strengthened by the knowledge that Mr. Tugwell had previously recorded *bondii* from Lyme Regis, a few miles from Charmouth, where the typical specimens of *morrisii* were captured by Mr. Morris. I wrote to Mr. Tugwell, asking him about the probability of *bondii* occurring at Charmouth, and he wrote: 'The locality for *bondii* at Lyme Regis is, I believe, about ten miles as the crow flies from Charmouth; but from what I saw of the coast-line, I should judge that *bondii* might occur in many places between the two towns. I only worked the Devonshire side of Lyme Regis, but found it in plenty there' (*in litt.* 18/7/92). This, therefore, helps to support my determination of Humphrey and Westwood's figure, and *morrisii* will have to be struck out as a variety of *arcuosa* and added as a synonym of *bondii*, which name, indeed, it will replace if *extrema* be not generally accepted for this species, as *morrisii* is much anterior to *bondii*. There can be no doubt that Humphrey and Westwood's figure is made from indubitable *morrisii*, for the specimens were sent by Mr. Beverley Morris from the collection of the Rev. F. O. Morris, the original captor. It has always appeared strange to me that so common a species as *bondii* has since proved itself to be in its favoured localities should have been quite unknown to our older collectors who met with many of our rarer species.

"With regard to the occurrence of *bondii* in the neighbourhood where the original *morrisii* came from, Mr. Goss writes: 'Although probably most lepidopterists are aware that *T. bondii* is to be found in the neighbourhood of Lyme Regis, I do not think the occurrence of this species in Devonshire has been noticed in this magazine. As the species is so extremely local, not only in this country but on the Continent of Europe, it may be as well to record the fact of my finding it in abundance, in the beginning of July last, on the rough broken ground forming the slopes of the cliff immediately to the west of the cement-works at Lyme Regis, well into Devonshire. It may be worth noting that of the two localities in this country from which this species has yet been obtained, one is in the south-east of Devon, and the other in the south-east of Kent' (Ent. Mo. Mag. xvii. p. 134); whilst the editors of the Ent. Mo. Mag. note at the same time that the

species was first discovered at Lyme Regis by Mr. Percy Wormald, and noticed in 'The Zoologist,' vol. xxi. p. 8861."

As the foregoing extract was published in 1892, and Mr. Meyrick's 'Handbook' in 1895, it would have been well if Dr. Knaggs, in correcting "some inaccuracies" made by Mr. Meyrick, had set forth logically both sides of the question, when he might have discovered that others who had studied the question *de novo* were in perfect accord with Mr. Meyrick.

I am rather inclined to think with Dr. Knaggs that the species will have to be in future written *Chortodes morrisii*, Morris, and not *Chortodes morrisii*, Dale.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 238.)

Eupithecia satyrata, *Hb.*—Is found commonly on all the bogs and moors of Ireland. It varies greatly, the whitish grey variety having been met with at Derry (*C.*); Churchill, Co. Armagh (*J.*); near Favour Royal, Tyrone; Moycullen, Connemara; Markree Castle, Sligo, and Knocknarea (*Russ*). A striking form with well-marked striæ, but perhaps not so strongly banded as most examples of the var. *curzoni*, occurs at Powerscourt, Co. Wicklow; and on the Belfast hills Mr. Watts met with similar specimens. The var. *subatrata* also occurs abundantly near Galway (*A.*), and Moycullen; at Mohill, Co. Leitrim; Favour Royal, Tyrone; and elsewhere.

Eupithecia castigata, *Hb.*—One of the commonest species of this genus throughout Ireland, and most variable in markings and tint. Large examples with strongly marked strigæ are often difficult to distinguish from *E. lariciata*.

Eupithecia jasioneata, *Crewe.*—This interesting species appears to be confined to the south-west corner of Ireland, not having so far been captured out of Kerry and the portion of Cork which includes Bantry Bay. In those districts, however, it is found abundantly both along the shores of Dingle and Bantry Bay, and inland from Kenmare, as well as about Killarney; in fact, generally wherever *Jasione montana* is plentiful. The first Irish specimens were brought as pupæ by certain collectors of Mr. Meek, who, taking them to belong to some common species, threw them out on a dust-heap in his yard. In due time many of them emerged, and proved to be the scarce *Eupithecia* named by Mr. Crewe from Cornish specimens. They are to be taken *in flight* at dusk where plentiful, but are more easily captured

as larvæ on their food-plant. They vary somewhat, and often are handsomely marked with pale strigæ outside the central spot and the elbowed line.

EUPITHECIA TRISIGNARIA, *H. S.*—Howth (*B.*) I have not met with it in Ireland.

EUPITHECIA VIRGAUREATA, *Dbl.* — Howth, Powerscourt, Co. Wicklow, and Killarney (*B.*); Knocknarea, rare (*Russ*), and Markree Castle, Co. Sligo; Armagh (*J.*); Clonbrock, Co. Galway (*R. E. D.*); Glendalough, Co. Wicklow. Mr. Campbell recorded this species from near Derry, as I understand, in error.

EUPITHECIA FRAXINATA, *Crewe.*—Very rare, Killarney; Clonbrock (*R. E. D.*) and Ardrahan, Co. Galway; Markree Castle, Co. Sligo.

EUPITHECIA PIMPINELLATA, *Hb.*—Howth (*B.*). At a quarry by Dean Rock on the Lough road, Cork (*Holt*); near Derry (*C.*); and probably Birchall's record of *denotata*, Killarney (*Wallace*) refers to this species.

EUPITHECIA VALERIANATA, *Hb.*—I have met with the larvæ in Lord Farnham's demesne, Cavan. Imagines taken at Moycullen, Co. Galway, were identified by Mr. Barrett as probably of this species.

[EUPITHECIA INNOTATA, *Hufn.*—Birchall's Wicklow record must be deleted. There is a reference in the Ent. Mo. Mag. vol. ii. 261, to a capture of this species in the "North of Ireland."]

EUPITHECIA INDIGATA, *Hb.*—This species has probably been overlooked, and will be found more widely distributed than my localities suggest. The tracts of country in Donegal, Galway, Leitrim, and Mayo, where wild juniper grows freely, still await careful exploration by entomologists. Altadiawan, Co. Tyrone (*M. F.*); Clonbrock (*R. E. D.*) and Galway (*A.*); Derry (*C.*); and some very black specimens taken near Belfast by Mr. Watts are questionably referable to this species, but probably to *assimilata* (*G. C. B.*).

EUPITHECIA CONSTRICTATA, *Gn.*—Mr. Barrett's statement that this insect was generally distributed and common, and that he had taken it in considerable numbers at Howth, Galway, and Killarney, has been corroborated by its subsequent capture in many localities since. Howth (*G. V. H.*), Glendalough, Co. Wicklow; Favour Royal, Tyrone; Armagh (*J.*); Castle Bellingham (*Thornhill*); Island Magee and Kilkeel, Co. Down (*W.*); Knocknarea (*Russ*) and Markree Castle, Co. Sligo; Drumaweir, Inishowen (*G. V. H.*), and Derry (*C.*); Kilcornan, Co. Galway. Staudinger gives no continental localities for this insect.

EUPITHECIA NANATA, *Hb.* – Universally distributed and common

on all the bogs and mountain tracts of Ireland. The whitish strigæ are sometimes not very conspicuous, but I have seen no specimens approaching var. *obscurata*, Stgr., in which they are almost obsolete.

EUPITHECIA SUBNOTATA, *Hb.*—Mr. Birchall met with it in some numbers. I have taken it on the Dublin coast, at Howth, Lambay Island, and Skerries.

EUPITHECIA VULGATA, *Haw.*—Everywhere common. Variable in colour and strength of markings. I have seen nothing like the Hebridean form.

EUPITHECIA ALBIPUNCTATA, *Haw.*—Larvæ taken at Queenstown, Co. Cork, by Harper-Crewe. Knocknarea (*Russ*).

EUPITHECIA EXPALLIDATA, *Gn.*—Wicklow (*Bw.*); Howth and Skerries, Co. Dublin; Castle Bellingham, several (*Thornhill*); Killynon, Westmeath, one; Magilligan, Co. Derry (*Curzon*). Great difficulty exists in identifying this species unless it is fresh, and some doubt having been expressed as to the captures of myself and Mr. Thornhill at Castle Bellingham, I have carefully compared the series with bred specimens from the collections of the late F. Bond and the Rev. Joseph Greene.

EUPITHECIA ABSINTHIATA, *Clerck.*—Generally common.

EUPITHECIA MINUTATA, *Gn.*—Rather common in most places.

EUPITHECIA ASSIMILATA, *Dbl.*—Dublin (*B.*); Roches Point, Co. Cork; Markree Castle, Co. Sligo; Clonbrock, Co. Galway; Favour Royal, Tyrone.

EUPITHECIA TENUIATA, *Hb.*—Widely spread, and often not uncommon. Killarney (*B.*); common in Co. Wicklow, at Arklow, Glenmalure, and Wooden Bridge (*G. V. H.*); Knockdrin, near Mullingar; Markree Castle, and Knocknarea (*Russ*), Co. Sligo; Derry (*W. E. H.*); Castle Bellingham, abundant, Co. Louth (*Thornhill*); Armagh, and Belleek, Co. Fermanagh (*J.*).

EUPITHECIA LARICIATA, *Frr.*—When I first added this species to the Irish list, I had little idea that it would subsequently prove so widely spread as subsequent observation has indicated. It would seem extremely improbable that Birchall could have overlooked it if it existed in his time with the same distribution and numerical proportions. His last supplement to the 'Catalogue' was published many years after its discovery in England. I am therefore of opinion that this moth is a recent introduction to our fauna, consequent on the extension of planting operations, especially of larch, since his time. The imago varies a good deal in size and marking, some specimens being small and obscurely marked, and approaching *E. castigata* in general appearance. Knockross, on the shore of L. Derrevaragh, Co. Westmeath, numerous; Altadiawan, Co. Tyrone, numerous;

Knocknarea (*Russ*) and Markree Castle, Co. Sligo; near Donegal; Drumreaske, Monaghan; Castle Bellingham, Louth (*Thornhill*); Glendalough, Co. Wicklow; Howth (*G. V. H.*); Cratloe, near Limerick; Ardrahan, and near Galway (*A.*).

EUPITHECIA ABBREVIATA, *St.*—Widely spread and common in many localities in Wicklow, Kerry, Galway, &c. I have not met with it numerously in the North of Ireland. The following are a few localities where it is more or less numerous:—Killarney; Powerscourt, Arklow, and Wooden Bridge, Wicklow; Clonbrock, very abundant, Co. Galway; Markree Castle, &c., Sligo; Derry (*C.*); Ballycastle, Co. Antrim (*Curzon*); Favour Royal, Tyrone; Drumreaske, Monaghan; Belleisle, on L. Erne, &c.

EUPITHECIA DODONEATA, *Gn.*—Has occurred in several widely separated districts in the centre and north of Ireland. Powerscourt and Glendalough, Co. Wicklow; Armagh (*J.*); near Galway, fairly abundant (*A.*); Knocknarea (*Russ*), (Ent. Record, vol. vii.).

EUPITHECIA EXIGUATA, *Hb.*—Not scarce, and widely spread. Common at Powerscourt and other parts of Wicklow; Dublin (*B.*); Killynon, Co. Westmeath (*Miss R.*); Drumreaske, Monaghan, abundant; Favour Royal, Tyrone; Kenmare and Killarney, numerous; Sligo (*Russ*); Clonbrock and Merlin Park, Galway.

EUPITHECIA SOBRINATA, *Hb.*—A good series was beaten from juniper at Tudor Cottage, near Kingstown, by the Rev. Joseph Greene many years ago. The Rev. W. F. Johnson has taken it at Armagh similarly. These no doubt are introduced specimens from nursery gardens. On the indigenous plants, however, it has also occurred at Knocknarea, near Sligo (*Russ*); and Mr. Barrett met with it in the Co. Antrim, and Mr. Watts at Slieve Donard, Co. Down.

EUPITHECIA TOGATA, *Hb.*—This pine-feeder appears to be spreading over an extensive area in Ireland as a result of the planting of spruce-fir, and must be considered an introduced species. I first met with it at Knockdrin, near Mullingar, where Miss Reynell captured the first specimen, and it proved to be fairly numerous, as well as at Rockview, where I took the larvæ abundantly. Agher, Co. Meath (*Miss R.*); Killarney, one (*W.*); Sligo, one (*M'C.*); Clonbrock, Co. Galway, abundant, by Mr. Dillon and myself; and at Coolarne in the same county (*A.*). At Mote Park, Roscommon, and at Charleville Forest, Tullamore, Kings Co., and Drumreaske, I found traces of the larvæ. The Irish specimens I have seen appear to belong to the true type, being handsomely marbled with red; while the Scottish grey form appears more like the species *abietaria*, Göze (as was

pointed out to me by Mr. Tutt, whose larvæ feed similarly on fir-cones.

EUPITHECIA PUMILATA, *Hb.*—Everywhere numerous in both emergences.

EUPITHECIA CORONATA, *Hb.*—Widely spread, but not apparently to be taken in numbers. Dublin, and Wicklow (*B.*); Drumreaske, Monaghan; Favour Royal, Tyrone; near Derry (*C.*); shores of L. Gill, Sligo; near Kenmare, and at Killarney; Crookhaven and Glengarriff, Co. Cork.

EUPITHECIA RECTANGULATA, *L.*—I have met with no remarkable forms in Ireland. It is numerous in many localities. Drumreaske, Monaghan; Armagh (*J.*); Ballygawley, Tyrone; Tempo Manor, Enniskillen (*Langham*); Castle Bellingham, Louth (*Thornhill*); Derry (*W. E. H.*); Rockwood, Sligo; Killarney; Clonbrock (*R. E. D.*); Galway, &c.

EUPITHECIA DEBILIATA, *Hb.*—Locally abundant in a few places. Torc Wood, Killarney; Markree and Rockwood, near Sligo; Glendalough, Co. Wicklow; Dromana, Co. Waterford; Clonbrock, Co. Galway, one (*R. E. D.*).

(To be continued.)

RE-APPEARANCE OF *DEILEPHILA GALII* ON THE LANCASHIRE AND CHESHIRE COAST.

By the Rev. A. Miles Moss.

Deilephila galii has been in the district again and we have all but missed it! If you tell your friends you are going to search for *D. galii* they laugh at you, and suggest that you might as well go out to look for gold watches! And this is the way we lose the prize.

No one will deny that the genuine, hard-working, field entomologist is a true sample of that dogged persistency of which we English, as a nation, are proud. He has made up his mind that he is not going to be beaten, and that no pains shall be spared when there is any reasonable chance of success.

But in a case like the present he is not always on the alert, and is sometimes apt to be behind the times. I know it has been so with me this year, or I should have been able to furnish the pages of the 'Entomologist' with a glowing record.

But to proceed. On Sunday, Sept. 12th, Mr. Prince, an entomological friend, told me that *D. galii* had turned up somewhere on the Welsh coast, and he suggested the possibility of it also occurring at Wallasey. So, determined to give the place a

thorough search on the first opportunity, I took train out to Wallasey on the following Tuesday, Sept. 14th. My friend would have joined me in the expedition had he been free, but he was unfortunately detained by work.

On approaching the Wallasey golf-house I met a boy with a butterfly net, so I made his acquaintance, and asked him what he had found. He had not been searching the bedstraw, and had only got larvæ of *Bombyx rubi;* however, a man working on the greens had shown him a curious hawk-caterpillar, which he described as being like *Chœrocampa elpenor*, but with eyes all along the body. I guessed at once what it was, and thanked the lad for his information, telling him that in all probability it was the very creature I was in quest of. My first hunt therefore was to find this green-keeper, which I soon succeeded in doing, and there, sure enough, in the bottom of a tin was poor *galii*, trying to turn without any sand. The man very generously gave it to me, refusing to hear of any remuneration. I might mention here that it turned to a pupa the same evening on my return home, and is, I fear, slightly deformed through its rough handling. He had found it when half-grown, on a grassy meadow on the golf-course, and had kept it for a fortnight. It may seem an odd roundabout way of picking up knowledge, but this is where the motto of our excellent monthly journal comes in—"By mutual confidence and mutual aid great deeds are done and great discoveries made." To this spot I proceeded, but it did not look a likely place, as there was but little sand, and what bedstraw there was was growing amongst thick short grass. I could find no trace of any larvæ here, so I took a straight course of four or five hundred yards to the sandhills bordering the shore, where I soon discovered a mound with bedstraw growing sparsely all over the sand, and an occasional thicker patch.

It looked an ideal place, and so it would have been for me had I been there a week earlier. Not one or two, but numbers of *galii* had been feeding there, for the sand in many places was literally strewn with large pellets of frass, some still quite fresh, but I was too late. The nature of the place was such that I could not have missed them, had they been there as caterpillars, and an hour's diligent search only produced the shrivelled but unmistakable skin of one that had succumbed. In two other spots along the coast I found frass, but not in the same quantity, and was again only doomed to disappointment, finding two more dead. I could not leave without trying every expedient, so, borrowing a spade from a house on the links, I returned to the spot where the larvæ had been plentiful. I took my coat off and set to work with a will; but though I dug deep and shallow, and ere and there and everywhere, it was all to no purpose.

I feel confident that *galii*, like many other larvæ, sometimes

wanders some distance before turning, and with no apparent reason, except it be natural instinct of self-preservation, or some provision of nature whereby the creature, by being kept in motion, is the better able to get rid of all digested food, and thus become prepared for the pupal stage. We know not: it is merely my own idea and it may be wrong, though I can produce arguments to support it.

Even now, as I write, I have three or four larvæ of *Macroglossa stellatarum* that have turned colour, and have for two days been wandering round their box from end to end, apparently undecided as to where to pupate. I might mention that these larvæ, varying from infancy to old age, have just been found at West Kirby, on Sept. 18th, but no signs of *D. galii* were to be found there.

But I must get on This day, which had stirred my hopes and expectations to their very zenith, ended in failure and disappointment, and I went home feeling very angry with myself for not having been "more on the spot," in every sense of the term, a week earlier. I ought to add that on Aug. 17th I searched carefully over much of the same ground for *Chœrocampa porcellus* and *M. stellatarum* with much the same result. I was a week too late. The frass of both these larvæ, more especially *M. stellatarum*, was there, but they appeared to have been all of one batch, and every larva had gone down. Not a trace of any small *galii* larvæ did I see, showing clearly that the period from ova to full-grown larva must occupy less than four weeks.

The golfer after a bad day's sport goes home and vows he will never touch a club again, but invariably the next sunny morning sees him issuing forth to the fray again, recruited in strength and prepared to face and overcome any difficulty. In fact, some unknown quantity within him seems to whisper, "You can and will succeed if you stick to it and try again." It was with sentiments of a similar nature that the morning of Sept. 18th found me training out to Waterloo to make trial of the bedstraw there. A brief two hours' search was all that I could afford; however it was enough. The spot which I visited has been known to me since 1884, and, though in the midst of houses and infested by hens, the bedstraw grows well, and has generally been productive of *C. porcellus* and *M. stellatarum* (when present in the district at all). The first patch near the road showed me that *D. galii* had also visited the Lancashire coast this year, for there was the frass, and there, sad to say, was a dead caterpillar. The head and first two segments were quite fresh and still brightly coloured, but to all appearance a hen had been sampling the latter portion. Nearer to the sea I again found frass, but was once more disappointed as the caterpillar had gone, probably *having* buried on the previous day. However, success eventually

crowned my efforts; and in half an hour's time I was the happy possessor of three real living larvæ of *D. galii* nearly full fed. The search also revealed at least half a dozen other mashed-up remains in various stages of growth. The three which I found alive were not far apart from one another, but all in different places. It was the first time my eyes had beheld their full glory, and splendid creatures they are indeed. Two of these larvæ, after wandering round the breeding-cage in the same uneasy manner as *stellatarum* before mentioned, have at length buried; the third, I am happy to say, is now a successfully preserved specimen for the cabinet. It seemed a shame to kill it; but I think the action is justified by the result, for I never had a smooth caterpillar which retained its shape and colour better when blown. I have since been able to complete my search of the bedstraw growing along the coast-line as far as the ladies' golf-course at Hall Road, some two miles north of Waterloo, but can find no more traces of *galii*, though *stellatarum* has been there sparingly. Had I not been bound by parochial ties I should doubtless have made a still more thorough search for this interesting species; but the amount of time I have already spent on these sandy wastes has been smiting my conscience somewhat. However, one doesn't like to be beaten by a caterpillar; and, let these writing-desk entomologists say what they will, *galii* does *not* visit us every year.

I should like to say much more as to my own views about this reappearance, about migration, spasmodic habits, and the rest; for though so much has been written on the subject in connection with *D. galii* (*vide* letters by Messrs. Briggs, Corbett, Sharp, Tugwell, and Tutt in the 'Young Naturalist' for 1889 and 1890), yet how little can really be said to be *known*. So many *theories* are held, some of them more ingenious than practicable; but at present we must all confess that it is a subject over which there are infinite possibilities, and one which calls forth a corresponding amount of interest. It is on this account, and because I believe that others will be as interested as myself, that I have presumed to trespass on so much of the valuable space of this journal. If I have unnecessarily gone into details at too great length, I apologise for it; but to me this is where the interest lies.

I am awaiting the next few monthly issues with keen expectation to see what others have experienced this year with *D. galii*.

26, Hamilton Square, Birkenhead: Sept. 22nd, 1897.

NOTES AND OBSERVATIONS.

Variation of Callimorpha dominula, *Linn.*—The most widely distributed, and perhaps the best known aberrant form of this species is var. *rossica*, Kolenati. This only differs from the type in having the hind wings yellow instead of scarlet. It occurs occasionally in almost all localities where the type is found; Mr. Sabine obtained two specimens of it from Dover this year.

Var. *persona*, Hübn., is, so far as I know, only found in Southern Europe; the hind wings are black, with an irregular and interrupted yellow patch at the base, and one, sometimes two, small yellow spots beyond this patch; the spots on fore wings are much smaller than in the type. Var. *italica*, Standfuss, has the spots on fore wings very little larger than those of var. *persona*, and the yellow markings on hind wings are more extensive. In both these forms the abdomen is black; the thorax of *persona* is black also, and without, or with very faint traces of, yellow marking.

In var. *bithynica*, Staud., all the spots on fore wings are yellow, but it does not differ materially in any other respect from the type. Var. *hamelensis*, Pflüm., has all the spots on fore wings white.

Of these named varieties, *rossica* is the only one known to me to occur in England, but Kent is noted for the production of a melanic form. I have only seen one English example of this aberration, but Mr. Leech has a fine specimen of it in his collection, together with one or more examples of the other named forms. This specimen, which is labelled "Berlin," has the fore wings pretty much of the typical colour, but the spots are black, and only noticeable when the specimen is viewed in a certain way; the hind wings are also black, with the typical markings showing in certain lights; thorax colour of fore wings, abdomen black; under surface uniformly rusty black.

It has been stated that black specimens of *C. dominula* are pathological aberrations, and have no scientific value. To my mind the melanic form described above is quite as important from a scientific point of view as the other varieties of the species. As regards *rossica*, *persona*, *italica*, and the black form, I consider that they represent stages in the development of *C. dominula*, and that the black form is probably the most ancient.

I may mention that a remarkable aberration of the species, quite unlike any of those previously referred to in these notes, is figured in the 'Entomologist' for 1883 (xvi. p. 1), and I should add that I have not seen vars. *lusitanica*, *bieli*, and *romanovi*.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Aberration of Pieris rapæ.—Mr. Sabine, of Erith, has been good enough to send for inspection some interesting varieties of certain species of Lepidoptera that he obtained this season. Among these are two female specimens of *P. rapæ*, each of which has a small black spot on hind wings, placed between veins 3 and 4. In one example the costal spot of hind wing is much larger than usual, and the apical patch of fore wing extends, almost without interruption, to vein 4. They were taken by Mr. Sabine at Folkestone in September, and were the only examples of the species that he netted.

Mr. A. M. Montgomery, of Ealing, has also obtained this extra-spotted form of the species this year. He writes:—"In a small brood of *P. rapæ* (from ova deposited in captivity) three females out of twenty-two examples of that sex have a small cluster of black scales between veins 3 and 4. Two males out of sixteen in the same brood have traces of an additional spot placed below the usual black spot on fore wings. All the specimens emerged between August 18th and 25th."

Previous to receiving specimens from Mr. Sabine, I had not noticed this extra spot on the hind wings of *P. rapæ*, but I had seen it in females of the summer brood of both English and Irish *P. napi;* also in females of the allied *P. extensa* var. *eurydice* and *P. melete* var. *mandarina*, both from China. In one or two examples of the latter, which seem to be exceptional instances, the outer area of hind wings has a more or less complete broad black or fuscous border, and it occurs to me that the black spot between veins 3 and 4 is probably a remnant of this border in the case of *mandarina*. Possibly the other species also had, in some ancient stage of their development, hind wings banded or bordered with black, and the black spots between veins 3 and 4 are vestiges of such bands or borders.—R. S.

Aberration of Epinephele tithonus.—Mr. G. W. Oldfield has sent for examination the variety of *E. tithonus* described by him in the 'Entomologist' for 1878 (xi. p. 228), as he considered that it agreed with the aberrant example of this species figured *ante*, p. 253. It differs, however, from Mr. Spindler's specimen in the ground colour being pale brownish buff and not pinkish ochreous; the black ring of apical ocellus on the fore wing is present in Mr. Oldfield's insect, but absent in the Luggershall example. At the first October meeting of the South London Entomological and Natural History Society, Mr. Montgomery exhibited an aberrant example of *E. tithonus* which appeared to me to be almost identical with Mr. Oldfield's variety. A somewhat similar form of *Epinephele* (*Satyrus*) *ianira* is figured Entom xi. p. 1.—R. S.

Aberration of Vanessa urticæ.—In two specimens of *V. urticæ*, bred by Mr. Sabine, the three blue marks nearest the apex of fore wings are ray-like in character, and extend inwards along the nervules almost or quite to the edge of the black marginal border.—R. S.

Aberration of Smerinthus tiliæ.—From a larva found at Northampton an example of this insect was bred in which the broad central band on the fore wings is reduced to a small oblong spot. The outer margins are also much suffused with reddish.—A. D. Imms; "Linthurst," Oxford Road, Moseley, Worcestershire, Oct. 1897.

[The central band of fore wings is usually more or less interrupted about the middle, the lower portion is often absent, and less frequently the upper portion also; but all gradations between the complete band and its entire absence occur. An interesting specimen is figured (Entom. xxvii. p. 50) in which there is no trace of the band on the left fore wing, while on the right fore wing the band is merely represented by a spot at the outer end of the discal cell.—Ed.]

Gynandrous Example of Dicranura bifida. — In this specimen,

which was bred by Mr. Lewington, of Market Rasen, the right side is male and the left side female. So far as can be seen with the aid of a strong lens, the bilateralism seems to extend to the sexual organs, so that gynandromorphism is complete. Dorfmeister (Stett. Ent. Zeit. 1868, p. 181), theorising upon the origin of gynandrous specimens of Lepidoptera, suggests that part of a male germ and part of a female germ come together in the formation of the egg which is destined to produce a gynandrous example. Consequently, wherever one such specimen appears in a brood there should be another similar one resulting from the other parts of the two germs. As a test of the soundness of his views, he proposed that experiments should be tried by breeding whole broods from the egg, and instanced *Ocneria dispar* and *Lasiocampa quercifolia* as suitable species for the purpose. Further information on the subject will be found in a paper entitled "Über die hermaphroditische Anlage der Sexual drüsen beim Männchen von *Phyllodromia germanica*," published in 1890 (Zool. Anz. xiii. 451–457).

Gynandrous example of Lycæna icarus. — A specimen of *L. icarus*, sent to Mr. Sabine from Dover, has the left wings male in character on both surfaces, but the right wings are those of a female, the upper surface being coloured bright blue as in var. *cærulea*. The orange lunules on the upper surface of the right fore wing are present, but not clearly defined, whilst those of the right hind wing are partly absent.

Leucorrhinia dubia, *var.* — All the wings suffused with smoky saffron, the suffusion strongest at the wing bases, and weakening gradually towards the margins. A specimen taken on Whitegate Heaths (Delamere Forest), June 5th; the only one I have ever captured.—J. Arkle; Chester.

Acosmetia morrisii, Morris.—With regard to Dr. Knaggs's note on this insect (*ante*, p. 256), I should like to call attention to the fact that Mr. Meyrick has simply accepted the conclusions arrived at in Tutt's 'British Noctuæ,' vol. iv. pp. 99–100, where a discussion of the matter will be found, which has apparently been overlooked by Dr. Knaggs. It appears to me that, even if Morris's original description is inadequate, the work of Humphreys and Westwood should not be left out of consideration.—Louis B. Prout; 246, Richmond Road, N.E., Oct. 8, 1897.

White Female of Colias chrysotheme near Vienna.—On Aug. 25th last, when I was collecting *C. chrysotheme* on the high ground above Mödling, in the neighbourhood of Vienna, I was fortunate enough to take one white female, freshly emerged and in perfect condition, as indeed were most of its more gaily-coloured, if less interesting, companions. There was no doubt as to its identity, as neither *C. edusa* nor *C. myrmidone* were flying in that locality, and it resembled the other females exactly in size, shape of wings, and markings. About a week later I had the pleasure of a few minutes' conversation with Dr. Staudinger at Dresden, and upon making inquiries from him respecting this insect he informed me that a white variety of *C. chrysotheme* had never before come under his notice; it had no name, and he did not possess one in the whole of his immense collection. However, he said as this form occurred not unfrequently among other species of this genus, there was no reason why *C. chrysotheme* should be an exception.

I should be very glad if any continental collector would tell me if they have ever met with it. I also took, on Aug. 27th, in the same locality, a male specimen of this species in which the entire orange ground-colour of both wings was vividly shot with pink-mauve, a few of the females possessing a very slight inclination to the same. Is this a common feature in fresh specimens of *C. chrysotheme?*—M. E. FOUNTAINE; 7, Lansdowne Place (East), Bath, Oct. 1897.

MONOGRAPHS OF THE GENERA OF LEPIDOPTERA.—Messrs. L. Reeve & Co. announce that they are about to publish a series of Monographs of the genera of Lepidoptera. The first of the series will be on the genus *Teracolus*, by Miss E. M. Bowdler-Sharpe; this will be illustrated by figures of all known species from drawings by Miss Maud Horman-Fisher.

LARVA OF LOPHYRUS PINI FEEDING ON HEATHER.—The sawfly larvæ referred to (*ante*, p. 69) emerged as perfect insects June 6th and 11th. Mr. W. F. Kirby, who kindly identified the species for me, writes:—"The sawflies prove to be *Lophyrus pini*, Linn., a common species enough; but yet you have made a discovery of some interest and importance, for Cameron says the Lophyridinæ feed exclusively on Coniferæ; and I am not sure that *any* sawfly has hitherto been recorded to feed on heath."—J. ARKLE; Chester.

BOMBYX RUBI LARVÆ.—I have several times kept these over the winter under a bell-glass in an orchard, feeding them with bramble. I have reared *Arctia fuliginosa* in the same way.—E. MEYNELL; Durham.

FURTHER NOTE ON STAUROPUS FAGI. — Referring to my last note to you on *S. fagi* (ante, p. 270), I may say that the larvæ are now spinning up all right, also that, although they were eight days less in the egg state, they were eight days longer in the larval state than the spring brood. From the time the eggs were deposited to the time the first larva spun up exactly fifty-seven days elapsed in the case of each brood; so what the second brood gained in the egg state they lost in the larval state.—W. E. BUTLER; Hayling House, Oxford Road, Reading, Oct. 11, 1897.

LARVA OF LOPHOPTERYX CAMELINA FEEDING ON WILD CHERRY.—When sugaring last month for *Xanthia aurago*, I found a larva of *L. camelina* feeding on wild cherry. I cannot find it given as a food-plant for that species in any of the books I have. — W. E. BUTLER; Hayling House, Oxford Road, Reading, Oct. 11, 1897.

LARENTIA FLAVICINCTATA IN IRELAND. — A specimen of this species, taken in Antrim, was exhibited at the September meeting of the South London Entomological and Natural History Society.

CAPTURES AND FIELD REPORTS.

ENNOMOS AUTUMNARIA (ALNIARIA) IN SOUTH HANTS.—A specimen of this rare moth was taken here (Portchester) during the third week in September, by Mr. Thomas Russell, who has kindly given it to me. It was in good condition. According to Kirby this insect is rare in England: is that so?—MADELINE J. STARES; Portchester, Oct. 9th, 1897.

[Although the occurrence of this species in a wild state in England

may, perhaps, be regarded as a rare event, it has been reared in numbers from ova obtained in the first instance from females captured in this country, chiefly on the south-east coast. There are other records of its having been found in Hampshire.—ED.]

PLUSIA MONETA AT WALTON-ON-THAMES.—On July 8th last I captured a specimen of *Plusia moneta* at Walton-on-Thames. It was in very fair condition.—C. N. HUGHES; 21, St. Ermins Mansions, Westminster, S.W.

ACRONYCTA ALNI AT LIGHT.—I was much pleased at taking a specimen of this insect, at light, on June 27th, and would like to know if it has occurred in this locality before. Does it usually come to light?—W. A. TYERMAN; Damfield, Maghull, Lancashire. [There are several records of the occurrence of this species in Lancashire, but we do not recall any previous instance of its having been taken at light.—ED.]

ACHERONTIA ATROPOS IN LANCASHIRE.—On Sept. 2nd this year a fine specimen of *A. atropos* (now in my possession) was captured by a friend, flying about in his house at Patricroft, a small town five miles from Manchester. This insect, so far as my experience goes, is a very unusual visitor to this neighbourhood, and as I have not seen recorded or heard of any other recent captures, I should be pleased to learn the experience of my brother entomologists in Lancashire with regard to the species.—W. BUCKLEY; 17, Upper Moss Lane, Hulme, Manchester, Sept. 28th, 1897.

SPHINX CONVOLVULI IN LINCOLNSHIRE.—A specimen of *Sphinx convolvuli* was brought to me on August 19th, which had been picked up from the pavement a few yards from my door. It was seen to fly from a privet-hedge. On examining it, I found its abdomen torn as if a mouse or bird had been attacking it. I may add that it was about the middle of the day when the specimen was found.—W. LEWINGTON; Market Rasen, Lincs.

SPHINX CONVOLVULI IN SOUTH YORKSHIRE.—On Sept. 6th last I had a specimen of *S. convolvuli* brought to me by the owner of a foundry in the centre of this town, who found it at rest on the wall of a workshop. Electric light is used on the premises, so no doubt that was the attraction. Unfortunately, when it reached me it had gone through the inevitable match-box treatment, and is not in the best of condition. This is the second Barnsley specimen I have.—J. HARRISON; 7, Gawber Road, Barnsley.

SPHINX CONVOLVULI IN WORCESTERSHIRE.—A fine specimen of this moth was taken at rest on Sept. 3rd; and on the 7th I saw a second specimen hovering over the bloom of *Nicotiana affinis* in my garden. By the time I had rigged my net it had disappeared.—W. EDWARDS; Malvern.

SPHINX CONVOLVULI IN SCOTLAND.—A specimen of *S. convolvuli* was sent to me in September from Sutherlandshire.—W. M. CHRISTY; Watergate.

COLIAS EDUSA IN NORTH DEVONSHIRE.—At Braunton, N. Devon, on Aug. 10th last, I captured two specimens of *C. edusa* and saw another, all within the space of five minutes, but did not see any more of this species during my stay of a fortnight there.—CHAS. BARTLETT; 58, Woodstock Road, Redland, Bristol, Oct. 2nd, 1897.

COLIAS EDUSA AT EARNLEY, NEAR CHICHESTER.—I have seen, and know of, but one example of *Colias edusa* in this neighbourhood this season. The butterfly was taken at Earnley one day in the last week of August, by Master Arthur Buckell of this city.—JOSEPH ANDERSON Jun.; Chichester.

COLIAS EDUSA IN THE PORTSMOUTH DISTRICT.—Mr. Christy reports a specimen of *C. edusa* seen near Portsmouth in July.

COLIAS EDUSA AND SPHINX LIGUSTRI IN PEMBROKESHIRE.—*C. edusa* was fairly abundant at Tenby in the latter part of August and beginning of September, chiefly on the sandhills ("The Burrows"), where on several days I saw five or six on the wing. *V. cardui* was scarce. *Sphinx ligustri* larvæ unusually abundant in the town and neighbourhood. I found ten in one garden, on lilac.—E. MEYNELL; Durham.

PIERIS DAPLIDICE IN KENT.—A female specimen of *Pieris daplidice* was captured on Aug. 27th last, at Dover, and an example (sex not mentioned) was seen at Herne Bay during the same month (Ent. Mo. Mag. October, 1897).

OCHSENHEIMERIA VACCULELLA IN SOUTH LONDON.—Mr. Percy Richards (Ent. Mo. Mag. October, 1897) states that this species was common in September in the neighbourhood of Brockley.

COLEOPTERA IN 1897.—The following are among my captures of this order during the past year; where no locality is specially mentioned, Worcestershire is intended:—*Cicindela campestris*, Sutton Park (N. Warwickshire). *C. hybrida*, one from Hoylake. *Carabus violaceus*, *C. nemoralis*, the commonest of the larger Carabidæ here. *C. monilis*, scarce this year. *Pterostichus niger*, *Notiophilus biguttatus*, *Dytiscus marginalis*, *Ocypus olens*, *Timarcha lævigata*, common on mountain paths about Barmouth. *Dromius quadrimaculatus*, *Geotrupes stercorarius*, *G. sylvaticus*, *Helophorus rugosus*, one only, at roots of poplar. *Hister unicolor*, *H. cadaverinus*, *Elater pectinicornis*, *Meligethes æneus*, *Pyrochroa coccinea*, rather common. *Tomicus* (? sp.), very destructive to a couple of oaks in Sutton Park. *Anomala frischii*, received from Hoylake. *Apoderus coryli*, one on hazel at Barmouth. *Attelabus curculionoides*, by sweeping flowers, Sutton Park. *Otiorrhynchus picipes*, *Chrysomela distinguenda*, *C. polita*, *Apteropeda graminis*, *Phyllotreta nemorum*, scarce.—A. D. IMMS; "Linthurst," Oxford Road, Moseley, October, 1897.

AUTUMN COLLECTING IN CARLISLE DISTRICT.—Sugaring during this last few weeks has shown a decided improvement here, compared with the earlier part of the season. *Anchocelis litura*, *A. rufina*, *Cerastis vaccinii*, *Miselia oxyacanthæ*, and *Hadena protea* have been very common, while *Agrotis suffusa*, *Noctua glareosa*, *N. castanea* var. *neglecta*, *Orthosia lota*, *O. macilenta*, *Anchocelis lunosa* (new to Carlisle list), *Scopelosoma satellitia*, *Agriopis aprilina*, and *Calocampa exoleta*, have all occurred more or less freely. *P. gamma* has fairly swarmed everywhere. I have also seen about half a dozen *Vanessa cardui*; this is a very scarce butterfly here now. *V. atalanta* has been very common, both larva and imago; last season I only saw a single specimen. The larva of *Smerinthus ocellatus* has been extremely common on dwarf sallows, as also has the larva of *Dicranura vinula*. The "picture-makers" have played havoc with both. *Phalera bucephala* has been in myriads. Larvæ of *Dicranura furcula*, *Notodonta ziczac*, and *Gonoptera libatrix* have also occurred. The larva of *Bombyx rubi*, which last season was observed in unprecedented numbers, is extremely scarce this season; in fact, last year, I counted 175 in a few square yards; this year I only found twenty in a day's collecting.—J. E. THWAYTES; 8, Clement Place, Boundary Road, Carlisle, Oct. 18th, 1897.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*October 6th*, 1897.—The Rev. Canon Fowler, F.L.S., Vice-President, in the chair. Mr. W. H. Bennett, of 15, Wellington Place, Hastings, and Mr. B. Tomlin, of 59, Liverpool Road, Chester, were elected Fellows of the Society. Mr. Merrifield exhibited specimens of *Aporia cratægi* and *Argynnis paphia*, subjected to high and low temperature during the pupal stage. In both species the examples which had been cooled were much darkened. Mr. Tutt showed for comparison the extremes of over 500 examples of *A. cratægi* bred or captured in Kent between 1860 and 1868, but none were so marked as those which had been artificially treated. Mr. Tutt showed a remarkable melanic aberration of *Nemeophila plantaginis*, in which all trace of the pale ground colour of the hind wings was lost; also a series of *Abraxas ulmata* captured during the past summer by Mr. Dutton in the neighbourhood of York. Previously aberrations of the species had been rare, but a large number of this series were suffused with blue-grey or smoky ochreous. Many of the aberrant forms were cripples. He also showed, for Dr. Riding and Mr. Bacot, bred specimens of both broods of *Tephrosia bistortata* from Clevedon, Somerset; and bred specimens of *T. crepuscularia* and its ab. *delamerensis* from York. Hybrids were exhibited between *T. bistortata* (male and female) and *T. crepuscularia* (male and female), between the former and the form *delamerensis* (male and female), and between the two latter crosses. The offspring of the first crosses were roughly divisible into two groups following the parent forms; those of the second tended to become mongrel in appearance. Hybridization led to the production of continuous broods, and certain broods tended to produce males only. The coloration became more intense with increase in the duration of the pupal stage. Dr. Dixey drew attention to the experiments on hybridization recorded in Dr. Standfuss's 'Handbuch der Paläarktischen Gross Schmetterlingen,' and gave a summary of the results. Mr. Champion showed, for the Rev. J. H. Hocking, an example of the long-bodied moth *Satacoma agrionata*, from New Zealand; also one of *Protopaussus walkeri*, Waterh., from China, the subject of a later communication; and specimens of the rare *Emblethis verbasci*, F., from the Scilly Isles. Mr. Jacoby showed a Halticid beetle with a singular abnormality, the side-margin of the prothorax being split and embracing a long process. Dr. Chapman exhibited and described varieties of *Spilosoma lubricipeda* and *Acronycta psi*, bred by Dr. Riding. In the latter species the characters of the different races were very stable. Mr. Burr exhibited a Mantis, *Phyllocrania illudens*, from Madagascar, with a close resemblance to the dead leaves among which it lived, some of which were shown with it. A new British coccid, *Kermes variegatus*, from Kent, was exhibited by Mr. Waterhouse. Mr. G. C. Griffiths read a paper on "The Frenulum of the Lepidoptera." Mr. Kirkaldy communicated a "Preliminary Revision of the Notonectidæ, Part I."; and Mr. Waterhouse the "Description of a new Coleopterous Insect of the family Paussidæ."

[Reports of other Societies are unavoidably postponed until December.]

THE ENTOMOLOGIST

VOL. XXX.] DECEMBER, 1897. [No. 415.

THE LARVA OF *PHORODESMA PUSTULATA* (*BAJULARIA*).

BY HENRY A. AULD.

THERE is probably no more interesting example of protective resemblance than that afforded by the larvæ of *Phorodesma*. So much do they liken themselves to their surroundings that old collectors have times out of number unconsciously ejected them from the beating-tray; and even when they have been

pointed out to the keen-sighted ardent young entomologist, so much surprise has been expressed at their quaint appearance, that I think it not amiss to ask the indulgence of our Editor in reproducing a beautiful drawing which has been lent to me by my kind friend Dr. Knaggs, whose son-in-law Mr. Victor Prout has caught and portrayed the larvæ in just such positions as they assume in nature.

The first time that I met with the larvæ of *P. pustulata* (*bajularia*) in any numbers was when beating into a Bignell tray in the New Forest, about the middle of May of the present year. A succession of severe night-frosts had cut off all the young foliage from the oak-trees, leaving in their place only the buds, which were bursting out afresh. Larvæ were not plentiful, and for awhile it looked like returning with empty boxes, but presently *Boarmia roboraria* yielded to the beating-stick; then, later on, it would be my luck to bring down a couple of *Hylophila quercana* at a stroke. There were, of course, many blackened oak-leaves and pieces of dead wood, with an occasional larva of *Cleora lichenaria* in the beatings; and it was when examining such a mixture that I spied some brown oak-bud husks standing up, a trembling mass on the tray. My acquaintance with the larva of *P. smaragdaria* at once led me to detect its full-dressed relation *P. pustulata*, which, when picked up, slipped through my fingers, hanging by a silken cord like the individual in the illustration. In that position who could help holding it in admiration, wondering at the facile way it fools the naturalist and outwits the bird and its other enemies. I enjoyed a hearty laugh when I got the larvæ home, for an oak-bud and a larva were in the position shown (5, in figure) when I asked one of our progressive entomologists whether he happened to be acquainted with it. "No," said he, "I should like to see it." So I handed him the twig, which he turned round and round, and then asked, "Where is the brute!" thus reminding one of the other *Phorodesma*—*P. smaragdaria*, of which it has been said: "I shall show you the larva and you shall not see it." For ten long months *P. pustulata* leads a caterpillar life, anchoring itself tightly by a silken fastening to the oak to withstand the winter winds. It is very active when the genial warmth of spring sets it to work to gain the imago state, and it may then be seen as in the figure, sleeping, waking, breakfasting, and taking exercise on the trapeze.

A most excellent description is given in the pages of the E. M. M. (vol. ii. pp. 91 and 114) respecting the life-history of *P. bajularia* (*pustulata*). It would be superfluous for me to add to the information which the Revs. E. Horton and John Hellins have there supplied. My desire is to try to make the larva familiar to the collector, and I trust that these few remarks may have the desired result.

ACOSMETIA (*MIANA*) *ARCUOSA*, Hw., var. *MORRISII*, Morris.

By H. Guard Knaggs, M.D., F.L.S.

Referring to my reproduction of the original description of *morrisii* in your October number (*ante*, p. 256), Mr. Louis B. Prout (*ante*, p. 296) calls attention to the fact that Mr. Meyrick simply accepted the conclusions arrived at by Mr. Tutt, which is satisfactory, though only in so far as it shows the correctness of my supposition that the writer in the 'Handbook' had never seen either *morrisii* or the original description of it. I can assure Mr. Prout that I have not overlooked either Mr. Tutt's "discussion" on *morrisii* referred to, or the article in which he candidly explained the peculiar method of reasoning by which he arrived at his conclusions; and as the latter seems to me to be particularly interesting and instructive, I should like, with the editor's permission, to place it before the readers of the 'Entomologist.' The passage ('Ent. Record,' iv. pp. 72, 73) runs as follows:—

"Fig. 1 represents *Acosmetia morrisii*, Dale, a species we have known for some time as *bondii*, Knaggs. It has always appeared wonderful to me that a species turned up at Folkestone as late as 1861 should then have required a new name; this remarkable circumstance I have repeatedly communicated to entomological friends. I was set on the move about this species first by a note which Mr. Dale wrote to the 'Ent. Record,' vol. i. p. 34, in which he refers *morrisii* to *arcuosa* as a pale var. I wanted to know more about *morrisii* for my book on the British Noctuæ; but for some time I could not find anything. However, one day, looking through the last plates of Noctuæ in Humphrey and Westwood's 'British Moths,' I came across a figure, at the sight of which I ejaculated, '*extrema*, Hb.—*bondii*, Knaggs.' I turned to the letterpress, and the name was *morrisii*. I immediately went to my cabinet, satisfied myself as to its identity with *bondii* at once, both from the figure and letterpress (the hind wings of the figure are unmistakeable), and then set to work to learn more. The specimen from which the figure was made was captured by Mr. Morris himself at Charmouth, in the same line of coast, and about ten miles from the well-known locality for *bondii* at Lyme Regis, discovered by Mr. Wormald; and afterwards captured there in plenty by Messrs. Goss and Tugwell. The greatest puzzle about the whole affair, is to think that a species described by Mr. Dale in the 'Naturalist,' vol. ii. p. 88, and errata, figured by Humphrey and Westwood in 1843 or 1844 under Dale's name, should be re-described in 1861 (eighteen years at the most), and accepted by entomologists without question. Perhaps they lived more slowly in those days; at any rate, they appear to have

lived with their eyes partly shut. I am not particularly surprised that Dr. Knaggs re-described the species. The few years that he was devoted to the study of Lepidoptera brought many new things to light, which have since sunk into darkness; but I am astonished that men of comparatively good scientific knowledge, with Humphrey and Westwood always in their hands as their every-day reference book, did not detect the blunder committed by a (may I say?) then comparative beginner. Perhaps it was then as it is now. If work be not done in the groove laid down by our extra-scientific friends, it is something to be ignored and jumped upon. This it appears to have been taken for granted, was bound to be correct, and did not require enquiring into. Fancy the lepidopterists of to-day letting some comparative beginner re-describe a species only eighteen years old; and yet this is what the entomologists of 1861 did. *Bondii*, Knaggs, will, therefore, have in future to be labelled *morrisii*, Dale."

Mr. Prout evidently doubts the adequacy of Mr. Morris's description to sink *bondii* as a synonym of *morrisii;* and certainly *bondii* is not of a pale straw colour assimilating to the colour of sun-dried grass (indeed the contrast between the almost chalky white moths settled upon the dark green foliage of their food-plant on a summer's evening is about as striking as can well be imagined); neither does it possess faint narrow brown lines diverging towards the margin; nor is it attached to a grass which becomes desiccated in summer; nor has it ever, as far as I can learn, been known to fly by day. And, further, a liassic soil, such as occurs at Charmouth, seems to me to be a very unlikely one for *bondii* to inhabit. On the other hand, the description is fully adequate to identify *arcuosa*, male, especially if worn, when the dotted elbowed line is apt to become indistinct or obsolete, the diverging lines to show up more conspicuously, and the hind wings to fade, as appears to have been the case in the specimens named *morrisii*.

Mr. C. W. Dale (son of the late respected Mr. J. C. Dale, and inheritor, I believe, of his father's collection), who has, in all probability, seen the insect, if it was considered worth preserving, and heard from his father's lips its history from its "discovery" to its suppression, ought surely to be better qualified to give an authoritative opinion on *morrisii* than any other entomologist who has never enjoyed these advantages. Mr. Dale has stated decidedly ('Ent. Record,' vol. i. p. 34) that *morrisii* is a pale variety of *arcuosa;* and every line, every word of Mr. Morris's description confirms his decision. The alar expanse, build, colour, and markings, — the narrow brown lines diverging towards the margin (not to mention the slightly brown costa, noted by Humphrey and Westwood);—all agree with *arcuosa*. The starting up and flying by day, when alarmed, is a well-known habit of *arcuosa;* and the long grass, which, as its seed

ripens, becomes parched up and more or less bleached in the hot rays of the summer sun, points to *Aira cæspitosa*, the food of *arcuosa*.

Folkestone, November 4th, 1897.

NOTE.—In reading Mr. Morris's description, his meaning will be much simplified by bearing in mind that by "the wings" he meant *all four wings*, so that "the upper part of the wings" = *the upper wings*, just as "the wings underneath" (or "the under part of the wings") = *the under wings*.—H. G. K.

NEW SPECIES OF *ANDRENA* FROM NORTH AMERICA.

BY T. D. A. COCKERELL, N. M. Agr. Exp. Sta.

THE bees of the genus *Andrena* are very numerous in North America, but up to the present time they have received comparatively little attention. Mr. F. Smith, many years ago, described a number of species from Canada and the Eastern United States, as well as five from Vancouver's Island. Mr. Cresson described several from Texas, and one from New Mexico. Mr. Ashmead described four collected by the present writer in Colorado. L'Abbé Provancher made known some new species from Canada, and two from California. From Mexico six have been described by Smith, and one by Gribodo.

Subsequent to most of the above-mentioned publications, Mr. Robertson made a careful study of the *Andrenæ* of Illinois, and Miss J. E. Casad and the present writer studied those of New Mexico, and in each of these regions most of the species were found to be still undescribed.

So far, one hundred and fourteen species of *Andrena* have been described from North America (including Mexico). The European list is much longer.

(1.) ANDRENA PASCOENSIS, n. sp.

♀. Length about 15 mm., head and thorax black, *legs and abdomen mostly rufous*. Pubescence greyish white. *Face about as broad as long*, its sides covered with greyish white pubescence. *Clypeus with a diffused central yellow patch*; end of scape, and first flagellar joint, ferruginous beneath. Mesothorax moderately shiny, microscopically tessellate, with large punctures, becoming extremely dense at sides; enclosure of metathorax ill-defined. Tegulæ amber colour, transparent; *wings strongly suffused with yellowish*, except the apical cells; *apex dusky* with a slight violaceous lustre; nervures and stigma pale ferruginous. Legs ferruginous; the coxæ, anterior femora behind, middle femora except apical third, and posterior femora except extreme tip, black; pubescence of basal joints of tarsi ferruginous. Abdomen rather shiny,

broad, strongly and closely punctured, bright ferruginous; base and part of sides of first segment, and spot on each side of second, black; third and following segments suffused with black dorsally and ventrally, the apex quite dark. The second to fourth segments have dense creamy-white apical hair-bands, that on the second being slightly interrupted in the middle; fifth segment and apex covered with glittering very pale orange hair.

Hab. Pasco, Washington State, May 25th, 1896 (T. Kincaid).

A. pascoensis differs from *A. argemonis* by the broader abdomen with less parallel sides, the broader face, the greyish white (instead of fulvous) pubescence, the pale nervures, &c. From *A. fastuosa* it differs by having more red on the abdomen and legs, and the colour of the pubescence.

(2.) ANDRENA TREVORIS, n. sp.

♂. Length about 9 mm.; black with thin greyish white pubescence; clypeus yellow with two black spots; the four hindmost tarsi pale ferruginous. This closely resembles *A. bipunctata*, differing as follows:—Size larger; clypeus higher and less produced at sides, chrome yellow instead of lemon yellow; flagellum dark, scarcely brownish beneath; area between eyes and ocelli finely longitudinally striate; vertex shiny and more distinctly punctured; abdomen shiny, with small and sparse but distinct punctures; four hind tarsi light ferruginous; abdomen rather more hairy; nervures and stigma dark reddish brown; stigma smaller relatively to the size of the insect; third submarginal cell longer.

Hab. Olympia, Washington State, June 12th, 1895 (T. Kincaid).

(3.) ANDRENA APACHEORUM, n. sp.

♀. Length 10 mm.; black, with rather thin but tolerably long cream-coloured pubescence. *Abdominal segments* 1 *to* 4 *with thin apical bands of long hair, not interrupted;* fifth segment and *apex with fuscous hair.* Process of labrum broad and truncate; clypeus strongly punctured, with an ill-defined impunctate line; facial quadrangle about as broad as long; area between eyes and ocelli minutely lineolate or striatulate; vertex dull with sparse shallow punctures; antennæ dark, slightly ferruginous beneath towards tip; mesothorax and scutellum dull, minutely tessellate, practically impunctate; enclosure of metathorax ill-defined, minutely roughened, the areas on each side of it distinctly punctured; abdomen minutely tessellate, impunctate; tegulæ black; wings dusky hyaline, nervures piceous, stigma light brown with a dark margin; first submarginal cell hardly as long as second and third together; legs black with pale pubescence, that of the tarsi fuscous.

Hab. At flowers of *Bigelovia graveolens*, Tularosa Creek (near Blazer's Mill), New Mexico, August 23rd, 1897 (E. O. Wooton).

A. apacheorum is closely related to *A. fimbriata*, but the pubescence is not so yellow, that on the four hindmost tibiæ is

pale instead of fuscous or black, and the face is not so broad. The *fimbriata* used for comparison is from Hartford, Ct., September 15th, 1895 (S. N. Dunning). *A. electrica*, the other New Mexico species having dark hair at the apex of the abdomen, differs at once by the pale pubescence of the tarsi, and the distinct though minute and sparse punctures of the abdomen.

(4.) ANDRENA MENTZELIÆ, n. sp.

♀. Length 12½ mm.; black, the *pubescence pale yellow*, rather long and dense, whitish on thorax beneath, legs, and abdomen. Clypeus naked except at extreme sides, very shiny, impunctate in middle, punctured at sides; flagellum dark, with the faintest coffee-brown tint beneath; facial depressions covered by minute appressed pubescence; vertex sparsely but distinctly punctured; hair of occiput and cheeks long and abundant; process of labrum broad and truncate; *mesothorax dull, minutely tessellate, practically impunctate;* enclosure of metathorax minutely roughened, ill-defined; tegulæ obscure testaceous, appearing black in some lights; wings dull hyaline, apical margin somewhat dusky; stigma ferruginous with a dark margin; nervures fuscous; legs black, small joints of tarsi rufescent; abdomen only feebly shiny, minutely tessellate, with minute very sparse punctures; margins of all the segments with bands of long pale hairs; apex with slightly yellowish hair. Venter with white hair.

Hab. At flowers of *Mentzelia nuda*, Santa Fé, New Mexico, August 3rd (Ckll., 4132).

Cresson's description of *A. miserabilis* nearly applies to *A. mentzeliæ*, but the nervures of *miserabilis* are honey-yellow, and the abdomen is "shining, extremely minutely punctured." Provancher, who recognized *miserabilis* in a female caught at Ottawa, says the abdomen is "brilliant," and that the hair bands on the second and third segments are more or less interrupted. *A. hirticincta* differs from *mentzeliæ* by the brown pubescence of the tibiæ and tarsi and the black hairs of the end of the abdomen. *A. permitis* differs at once by the densely punctured abdomen. *A. texana* is only known in the male, but it is not likely to belong with our insect, on account of its shining abdomen. From *A. apacheorum* the present species is known by its larger size, and the light pubescence at the end of the abdomen.

(5.) ANDRENA GRANDIOR, n. sp.

♀. Length 11 mm.; black, with short sparse ochraceous pubescence. Belongs to Robertson's second group (Tr. Am. Ent. Soc., 1891, p. 50). Facial quadrangle about as broad as long; lateral facial depressions well-marked, covered with appressed pubescence; a patch of white hair on each side of the antennæ; clypeus exposed, shining, strongly and closely punctured, with no distinct smooth line; vertex with extremely large punctures; mesothorax with very large and strong, close punctures; scutellum and postscutellum with very large punctures; enclosure of metathorax very distinct, very strongly longi-

tudinally ridged, bounded behind by more or less of a rim; tegulæ piceous; wings smoky hyaline, barely darker at apex; nervures and stigma piceous; legs black; abdomen shining, rather finely but strongly and closely punctured; dorsal surface of first four segments practically nude, except for a well-marked patch of white hair on the lateral margins of the second to the fourth, some scattered glistening yellowish hairs across the middle of the third and fourth, and an indistinct fringe of very short hairs on the extreme margins of the second and third; fifth segment and apex clothed with orange-fulvous hairs; ventral segments with rather long fringes of white hair.

Hab. Olympia, Washington State, June 18th, 1895 (T. Kincaid).

A. grandior is related to *A. rugosa*, but it is larger, and the stigma is quite differently coloured. The base of the metathorax is similar in the two species.

(6.) ANDRENA STRIATIFRONS, n. sp.

♀. Length 11½ mm.; black, with moderately long and dense fulvous pubescence. Belongs to Robertson's second group. Facial quadrangle slightly broader than long; lateral facial depressions with appressed pubescence; clypeus hairy, but surface visible, shining, closely and strongly punctured, *no smooth line; front below ocelli strongly longitudinally striate;* vertex dull, with shallow obscure punctures; flagellum wholly dark; mandibles dark; basal process of labrum broad and rounded at end; mesothorax rather dull, with very large and close punctures, lacking in the centre; scutellum shiny, with very large punctures; sides of metathorax strongly rugoso-punctate; the enclosure strongly longitudinally wrinkled, bounded behind by a sharp edge; tegulæ piceous; pubescence of thorax a lively orange-fulvous; wings hyaline, faintly clouded at apex; nervures and stigma ferruginous; in the type specimen there are on one side only two submarginal cells, on the other three, but even here the second transverso-cubital nervure is incomplete below; legs black, with pale fulvous pubescence, hind tibiæ ferruginous suffused with black, *hind tarsi wholly ferruginous;* abdomen shining, *punctures scattered, minute and hardly visible, except the bases of the segments, which are very distinctly though rather sparsely punctured;* second to fourth segments with lateral patches of pale fulvous hair, representing very broadly interrupted bands; fifth segment clothed with fulvous hair at apex and sides; anal fimbria dark rufous. The longitudinal wrinkles of the metathoracic enclosure, while strong, are much weaker than those of *grandior*, and the intervals between them are granular.

Hab. Olympia, Washington State, April 19th, 1894 (T. Kincaid).

(7.) ANDRENA MACGILLIVRAYI, n. sp.

♀. Length 10 mm.; black, pubescence fulvous on occiput and thoracic dorsum, otherwise whitish or dull white. Facial quadrangle somewhat broader than long; lateral facial depressions with appressed pubescence; sides of face and area between antennæ with long pale

yellowish grey pubescence; clypeus with the surface not concealed, shiny *but minutely tessellate*, strongly and rather closely punctured, with a low median longitudinal ridge; front below ocelli strongly striate; vertex with irregular weak punctures; first joint of flagellum longer than second and third together; last joint feebly ferruginous; mandibles dark; *process of labrum strongly produced, narrow, rounded at end, shaped like the end of a finger;* thorax with long rather dense hair; *mesothorax dull, minutely rugulose, with shallow punctures; enclosure of metathorax minutely rugulose, poorly defined;* tegulæ shining dark brown; wings yellowish hyaline; nervures (except black subcostal nervure) and stigma ferruginous; first submarginal cell on cubital nervure about as long as the two others together; legs black, with whitish pubescence, becoming shining fulvous on the tarsi; *hind tarsi fusco-ferruginous;* abdomen fairly shiny, *minutely tessellate, the sparse weak punctures hardly noticeable;* hind margins of segments very narrowly testaceous; abdominal dorsum with thin scattered pubescence; hind margins of the second to fourth segments at sides with white pubescence, representing broadly interrupted hair-bands; *margin of fifth segment, and apex, thickly clothed with sooty or purplish fuscous hair;* ventral segments fringed with white hair.

Hab. Ithaca, N. Y., April 21st, 1890 (A. D. MacGillivray).

An ordinary-looking species, best distinguished by the clypeus and process of labrum. It is related to *A. salicis*, Rob., but is larger, and differs in the process of labrum and the abdomen without continuous bands.

(8.) ANDRENA NIGROCÆRULEA, n. sp.

♀. Length 10½ to 11½ mm.; dark blue, pubescence of thoracic dorsum ochraceous, elsewhere black; face covered with black hair; clypeus strongly punctured; antennæ black; mesothorax with shallow punctures; enclosure of metathorax minutely roughened, triangular, not bounded by a ridge; tegulæ shining black; wings dusky; nervures and stigma piceous; pleura with black hair; legs black, with black pubescence; abdomen minutely tessellate, impunctate, *apex densely clothed with black hair.*

♂. Length 9 mm., much more slender; antennæ very long, wholly black; wings clearer; pubescence long and thin, *all yellowish white, except black at sides of face and sides of occiput.* Vertex and mesothorax dull.

Hab. Olympia and Seattle, Washington State, in May (T. Kincaid). Many specimens.

Differs at once from *A. cerasifolii* by the impunctate abdomen. From *A. cærulea* and *A. geranii* it differs by the black hair at the apex of the abdomen.

Mesilla, New Mexico, U.S.A., October 24th, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 290.)

Lobophora sexalisata, *Hb.* — Local and scarce. It has occurred in localities in the north, south, east, and west, as follows:—Derry, rare (*C.*); Killarney (Torc and Mucross), rare; Glendalough, Co. Wicklow, one; Clonbrock, Co. Galway, two (*R. E. D.*).

Lobophora halterata, *Hufn.*—Local, though widely distributed, and more numerous in its haunts than the foregoing, but it is rarely to be met with in Ireland, though I believe not uncommon in many English counties. Recorded in 1872 as abundant at Limerick, by Mr. Talbot; Farnham, Cavan; Favour Royal, Tyrone, a few; Pontoon on L. Conn in Mayo, a few; Clonbrock, Co. Galway, scarce (*R.E.D.*); Castle Bellingham, Co. Louth, four (*Thornhill*); and on an island in L. Erne (*A.*).

Lobophora viretata, *Hb.* — Widely distributed, local, and fairly numerous in its haunts. Killarney (*B.*), where, at the foot of Torc Mt., I also took a small series on the stems of Scotch fir, a favourite resting-place for this species; Cappagh, Co. Waterford; Bray (*Bw.*) and Powerscourt, several, Co. Wicklow; Farnham, Cavan; Cookesborough, Co. Westmeath; Altadiawan, Co. Tyrone, one (*M. F.*); Drumreaske, Monaghan; Clonbrock, Co. Galway (*R. E. D.*).

Lobophora carpinata, *Bork.*—Although, curiously enough, this species escaped the notice of so active a collector as Birchall, it is to be found in most suitable localities in Ireland, sometimes in considerable abundance. The usual Irish form is similar to English specimens I have seen from Birmingham and other districts, being pale and slightly pencilled; but at Clonbrock, where I have found it one of the most abundant of spring geometers, the two narrow bands across the centre of the fore wing are strongly marked and slightly fuscous, and often coalesce toward the inner margin. Such specimens as are in my cabinet are mostly females, and Mr. Dillon informs me that this aberration becomes proportionally more numerous as the season advances, which would perhaps suggest that the character is more developed in that sex. I have a few from Westmeath and Tyrone, also strongly marked. No Irish examples, however, that I have seen can compare with the dark-banded Scottish form, either in the tone of shading of the bands, or in the fuscous ground colour which characterizes many of them. A green tinted variety I have taken in south Devon does not appear to exist here. Limerick (*Talbot*); Killarney; Favour Royal, and Altadiawan, Tyrone; near Derry (*C.* and *W. E. H.*);

Markree Castle and Rockwood, Sligo; Killynon (*Miss R.*) and Cookesborough, Co. Westmeath; near Ballinasloe; and at Clonbrock, abundant, Co. Galway. In Co. Wicklow it is generally distributed, but not numerous, *e.g.* Arklow, Glenmalure (*G.V.H.*), and Wooden Bridge (*M. F.*).

THERA JUNIPERATA, *L.*—Clonbrock (*R. E. D.*), Entom. xxvii. 191. Only a few specimens. Juniper is not indigenous in the district, but it is possible that this species may have been introduced into the pleasure-grounds of the demesne with imported plants of ornamental varieties.

THERA SIMULATA, *Hb.*—By some oversight this is entered in Birchall's Catalogue as "common." He probably referred to *T. simularia*, Bdv., a variety of the following species. This interesting moth was first discovered in Ireland by Mr. Russ, at Knocknarea, near Sligo, where scanty dwarf juniper plants struggle to exist on the stony wind-swept hill side. From larvæ he kindly supplied to me I bred a series of richly coloured specimens of a warmer tint than any I have seen from Scotland. It is also not uncommon about Merlin Park, Galway; and probably in all localities in that county where its food-plant flourishes, as at Ardrahan, &c., it will be found. Mr. W. E. Hart also took it on the Inishowen shores of L. Foyle, Co. Donegal. At Glenveagh, a most picturesque valley in that county, the mountain sides are luxuriantly clothed with tall juniper bushes. Here we may expect to find all the indigenous species which feed thereon, waiting the net of the first comer.

THERA VARIATA, *Schiff.*—This species, so unstable in its character, is found throughout Ireland abundantly. Until the principal variations are critically tabulated, I am not disposed to concede with Newman that the type is absent. Staudinger describes the type as "forma griscescens," Berce ('Faune Ent. Française') as "d'un gris un peu olivâtre, et saupoudré de blanchâtre, avec l'espace basilinéaire et une bande médiane noirâtre ou brunâtre," &c. Sven Lampa, "Askgråaktig." There are Irish forms which correspond pretty well to the above, with a blackish brown median, and dark basal band, but without any olive tint in the ground colour. Three Scandinavian examples in my cabinet from Sven Lampa are very pale forms. That sent as type is similar to many of the slightly marked grey Irish specimens, with a pale brown median band and scarcely traceable basal band. The second seems referable to *fulvata*, Fb. (*obeliscata*), being very similar to *Thera firmata*, Hb., but with the median band slightly more distinct. The third appears to correspond with var. *obliterata*, White, which is apparently a synonym of ab. *simularia*, Bdv. It is of a unicolorous ochre-grey, with pale fulvous central band not edged with any dark line. This form is found in Ireland occasionally. A very

melanic aberration was taken by me in the autumn, at Mote Park, Roscommon, of a sooty black with deeper black median band, the hind wings also being very sooty. A very similar one was captured by Mr. Dillon at Clonbrock. These are blacker than a Barnsley specimen in my cabinet, which is of a unicolorous dark warm brown, the median band being obsolete.

THERA FIRMATA, *Hb.*—Very few have been taken in Ireland, Cookesborough, Co. Westmeath (*Miss R.*); Howth (*G. V. H.*); Enniskillen (*Col. Partridge*).

HYPSIPETES RUBERATA, *Frr.*—The greater number of specimens which do duty for this species in British cabinets appear to me to be referable to a form of *T. trifasciata.* The present species, which is the larger, is decidedly scarce in Ireland. Specimens (mostly single) have been taken as follows:—Favour Royal, Co. Tyrone; Killynon, Co. Westmeath (*Miss R.*); Rockwood, Sligo; Killarney; and Clonbrock, Co. Galway (*R. E. D.*).

(To be continued.)

ORNITHOPTERA (POMPEOPTERA) IRREGULARIS, N. SP.

By WALTER DANNATT, F.E.S.

Male.—Anterior wings satiny bronze-black. Posterior wings satiny black. The golden yellow commences one mm. below the costal nervure, and continues with an irregular outline across the discoidal cell. There is a small streak of colour within the anal angle, and close to the cell. Between the discoidal cell and the costal nervure are five small golden yellow wedge-shaped patches, each differing in form and size, the smallest (in the third space) projecting only six mm. from the discoidal cell. Collar crimson.

This specimen is no doubt closely allied to *Ornithoptera helena*, both having the same habitat (New Guinea).

THE ASIATIC DISTRIBUTION OF BRITISH GEOMETRIDÆ.

(Continued from p. 247.)

TEPHROSIA LURIDATA, Bork.
Ectropis luridata, Meyr.

Mr. Leech remarks: "Japanese specimens are rather smaller than European examples; they are also more thickly powdered with brownish, and the pale spot on outer marginal area of primaries is of less size."

The species is also recorded from Amurland.

TEPHROSIA BIUNDULARIA, Bork. = *crepuscularia*, Hb.
Ectropis biundularia, Meyr.

Occurs in Amurland, Corea, Japan, Central and Western China, North-West Himalayas, Sikkim and Khásis.

Mr. Leech remarks: "This species varies considerably in size both in China and Japan. The smallest specimen is only 26 millim. in expanse, whilst the largest measures 58 millim. *Nikkonis*, Butl., is a strongly marked example of the type form, and, although rather larger, is not otherwise different in any material respect from specimens I have seen from Scotland. *Excellens*, Butl., is an unusually large form of the species; I have examples of it from Japan and Yesso."

TEPHROSIA PUNCTULARIA, Hb. = *ignobilis*, Butl.
Ectropis punctularia, Meyr.

This species is found in Eastern Siberia, Amurland, Japan, Yesso, and North-East China.

CLEORA (BOARMIA) GLABRARIA, Hb.
Selidosema glabraria, Meyr.

Occurs in Japan, Kurile Islands, and Western China.

BOARMIA REPANDATA, Linn.
Selidosema repandata, Meyr.

Special forms of this species have been developed in Eastern Asia, but some of the specimens, however, from Central and Western China, are identical with European modifications of the type form.

Represented in East Siberia, Amurland, Central, Western, and North-East China, Thibet, and North-West India.

BOARMIA CINCTARIA, Schiff. = *insolita*, Butl.
Selidosema cinctaria, Meyr.

A pale form (*insolita*, Butl.) occurs in Japan and Amurland, but some of the Japanese specimens are not separable from European examples.

BOARMIA ROBORARIA, Schiff.
Diastictis roboraria, Meyr.

Occurs in Amurland, Japan, Yesso, and Kiushiu.

Some of the Japanese specimens are strongly marked (*arguta*, Butl.); others are referable to var. *infuscata*, Staud. (= *lunifera*, Butl.); others, again, are quite typical.

BOARMIA CONSORTARIA, Fb.
Diastictis consortaria, Meyr.

Recorded from Amurland, Isle of Askold, Corea, Japan, and Central and Western China.

Neither Japanese nor Chinese specimens are quite of the normal European form as regards colour; the former are darker

(*conferenda*, Butl.); the latter are tinged with cinnamon-brown, and are also larger in size than the type.

BOARMIA ABIETARIA, Hb.
Deileptenia abietaria, Meyr.

Only recorded from Japan; the specimens are larger than European, and the markings are more pronounced.

ABRAXAS SYLVATA, Scop.

A very variable species in Eastern Asia, and a large number of the forms have been described as distinct species. All the named forms are, however, connected one with the other, and with the typical form by intergrades. Mr. Leech states that the largest specimen in his series measures 60 millim. in expanse, and the smallest 31 millim.

Occurs in Amurland, Japan, Corea, Central and Western China, N. W. Himalayas, Sikkim, Assam, Nilgiris, and Penang.

ABRAXAS GROSSULARIATA, Linn.

Recorded from East Siberia, Amurland, Japan, and Central China.

Referring to the form *conspurcata*, Butl., from Japan, Mr. Leech observes: "The markings on secondaries are certainly more decided than in any European specimens of *grossulariata* that I have seen, but the pattern is only a complete development of markings seen more or less clearly indicated in the majority of European *grossulariata*. Neither of the Japanese forms of this species diverges so widely from the type as do certain varieties of the species known to British entomologists."

Var. *sinicaria*, Leech, from Central China, has the markings on primaries "somewhat similar to those of *A. picaria*, but the markings on secondaries are much the same as in typical *A. grossulariata*, though not so pronounced—fuscous instead of black on all the wings. The yellow markings are in all cases less distinct, and in several specimens entirely obsolete."

LOMASPILIS MARGINATA, Linn. = *opis*, Butl.
Abraxas marginata, Meyr.

Occurs in Amurland, Japan, Yesso, and Central China.

Most of the Japanese specimens have rather black markings; in some examples the central band of each wing is entire, but in others it is twice interrupted (var. *opis*, Butl.).

Subfamily LARENTIINÆ.

ANAITIS PLAGIATA, Linn.
Eucestia plagiata, Meyr.

Recorded from Japan, Afghanistan, North-West Himalayas.

Mr. Leech states that "the examples of the first brood in Japan are paler, and those of second brood darker than European

specimens." Sir George Hampson, after describing the Indian form, remarks that the European form "usually has the dark lines and patches of fore wings more prominent and the latter tinged with rufous."

SCOTOSIA RHAMNATA, Schiff.
Philereme rhamnata, Meyr.

This species is represented in Japan by a form which Mr. Leech describes as var. *japanaria* which "differs from the European type in being larger and having a pale grey-brown coloration; the transverse lines are identical in number and form, but the space between the two central angulated lines is not darker. On the under surface the difference of colour is not so pronounced and the markings are typical."

Not recorded from any other part of Eastern Asia.

SCOTOSIA DUBITATA, Linn.
Hydriomena dubitata, Meyr.

Occurs in Japan and Central and Western China.

The specimens from China and Japan appear to be referable to var. *cinereata*, Steph., as they are paler in colour than the type, and the markings are not so well defined. Mr. Leech considers that *Scotosia* (*Thriphosa*) *oberthüri*, Hedem., from Amurland, may probably be a form of *S. dubitata*.

EUCOSMIA (SCOTOSIA) CERTATA, Hb.
Calocalpe certata, Meyr.

This species is found in Amurland, Isle of Askold, Japan, Yesso, and Central China.

Some of the Japanese specimens are strongly marked (var. *varia*, Hedem.). One male example from Ichang, Central China, which is very like a specimen in the series of *S. certata* from Japan in the National Collection, "has the central fascia of primaries well defined, the inner edge rather deeply indented towards costa, and the outer edge more than usually dentate."

EUCOSMIA (SCOTOSIA) UNDULATA, Linn.
Calocalpe undulata, Meyr.

Occurs in Amurland and Japan. The specimens are typical.

PHIBALAPTERYX TERSATA, Hb.
Eucymatoge tersata, Meyr.

Recorded from Japan and Central China.

The Japanese specimens "more nearly approach var. *tetricata*, Guen., than the type form, but they are not quite identical with either."

Var. *chinensis*, Leech.—"Smaller than typical specimens and rather redder in colour; less striated with white, and the submarginal white line is much obscured; there is a dusky shade before the second line of primaries and also one before the sub-

marginal line, the latter is connected with an oblique streak from apex."

PHIBALAPTERYX VITALBATA, Hb.
Eucymatoge vitalbata, Meyr.

Occurs of the typical form in Amurland, Japan, and Western China.

PHIBALAPTERYX (CIDARIA) POLYGRAMMATA, Bork.
Hydriomena polygrammata, Meyr.
Recorded from Amurland and Japan.

COLLIX (PHIBALAPTERYX) SPARSATA, Hb.
Eucymatoge sparsata, Meyr.

There was a typical example of this species in the late Mr. Henry Pryer's collection, which is now incorporated in that of Mr. Leech. The specimen was from Oiwake in Japan.

MELANIPPE (PLEMYRIA) HASTATA, Linn.

Found in Amurland and Western China.

Amurland specimens are referable to the typical form, but in Western China the species is represented by a specialised form, which Mr. Leech has named *chinensis* and described as follows:—"Basal half of all the wings black, traversed by three or four more or less interrupted wavy lines; outer margin broadly bordered with black, intersected by a wavy interrupted white line; intervening space white, intersected by a transverse series of black dots. Sometimes the secondaries are free from white markings on the black portions of the wing, and there are very few such markings on the primaries. Expanse 36–38 millim."

(To be continued.)

NOTES AND OBSERVATIONS.

EXHIBITION.—The North London Natural History Society will hold its Sixth Annual Exhibition, on Jan. 1st and 3rd, in the Lecture Hall of the North-east London Institute, Dalston Lane. Charge of the Entomological department will be undertaken by Mr. Louis B. Prout. Further particulars may be obtained from the Hon. Secretary, Mr. L. J. Tremayne, 4, Lanark Villas, Maida Vale, W.

PORTHESIA (EUPROCTIS) CHRYSORRHŒA A PEST IN AMERICA.—In a special Bulletin of the Hatch Experiment Station, Massachusetts Agricultural College, bearing the date July, 1897, and entitled "The Brown-tail Moth," Messrs. Fernald and Kirkland give an account of the occurrence of *P. chrysorrhœa* in the State of Massachusetts, and refer to it as a new insect pest. It would appear that while entomologists in Britain are asked to deal gently with this species, the American State just mentioned has obtained an Act "to require local authorities to suppress the Brown-tail Moth."

PARASITES OF THE HESSIAN-FLY AND OTHER SPECIES OF CECIDOMYIA.—Mr. William H. Ashmead, in the November number of 'Psyche,' records six species of hymenopterous parasites bred from *Cecidomyia destructor*, two of which are described as new to science. *C. avenæ*, *C. tritici*, and the parasites affecting them are also referred to.

CRAMBUS PERLELLUS *var.* ROSTELLUS IN SCOTLAND.—Mr. Meyrick (Ent. Mo. Mag. (2), viii. 255) records the occurrence of this small yellowish-grey form of *C. perlellus* on the sand-hills near Gairloch, Ross-shire, in the early part of September last.

EPIONE PARALLELARIA (VESPERTARIA) IN SCOTLAND.—Mr. Hewett states (Ent. Mo. Mag. p. 255) that this species has been taken near the town of Hawick, Roxburghshire.

LARVA OF ENNOMOS AUTUMNARIA (ALNIARIA) IN KENT.—In connection with the remarks on *E. autumnaria* (*ante*, p. 297), it may be well to note that Mr. Geo. C. Griffiths records a larva of this species obtained at Walmer in August last. It was found on a wall in the Dover Road, and produced a female example of the moth on Sept. 21st (Ent. Mo. Mag. p. 255).

NOTES ON PHYTOMYZA NIGRICORNIS.—Like many more injurious insects introduced into New Zealand from Europe and America, the so-called cineraria fly (*Phytomyza nigricornis*) is now widely dispersed, and has become a serious pest in the colony. In some districts it is now almost impossible to grow good cinerarias without the foliage of the plants being seriously injured or quite destroyed by this leaf-miner. It also mines the leaves of the globe artichoke, causing disfigurement and premature decay of the foliage in autumn. It likewise mines the leaves of the common sow-thistle (*Sonchus oleraceus*), the dandelion, chrysanthemums, peas, and the native poro-poro (*Solanum aviculare*), the latter plant in a less degree than any I have mentioned. The leaves of the cineraria and sow-thistle have quite a beautiful appearance when they are closely mined by several larvæ working in the same leaf. When they attack the native *Solanum aviculare* they do not appear to be able to make much progress in the more fleshy leaves of this plant. In the case of cinerarias, I find dusting the leaves lightly with white hellebore powder to be a perfect preventive against the attacks of the fly. The phenomenally rapid and wide dispersion of *P. nigricornis* in New Zealand may be noted. In January last I was at the Rangitata gorge, and there observed the larvæ very numerous mining the leaves of the sow-thistles growing amongst the *débris*, and in the damp niches of the rocks. In July I was in the upper Opihi valley, and also observed the larvæ mining the thistles growing under the limestone rocks. It is likewise very common in all the more settled districts of the South Island. In the North Island it has for several years been giving considerable trouble to lovers of cinerarias, and in a lesser degree to chrysanthemum growers. Owing to the recent very dry mild winter in New Zealand, the larvæ continued to mine the sow-thistle leaves wherever the latter remained green and growing. It is at all times interesting to note the habits of introduced injurious insects, and their treatment of the indigenous plants. Up

to the present time the *Solanum aviculare* is the only native plant I have noted attacked by *P. nigricornis*.—W. W. Smith; Sept. 28th, 1897.

Food-plant of the Larva of Tapinostola bondii.—Touching my note on the landslip of *bondii* locality (*ante*, p. 75), I find that I gave the food as *Arrhenatherum avenaceum*, whereas it should have been *Festuca arundinacea*. Tugwell was wrong, and Prof. Syme (Dr. Boswell-Syme) correct.—H. G. Knaggs; Folkestone, Nov. 23rd, 1897.

A curious use of Ants in Smyrna. — Mr. R. M. Middleton (Journ. Linn. Soc. Lond. Zool. xxv. 405) states that a Greek gentleman fell from his horse in Smyrna, and received a severe cut on the forehead above the right eye. "In accordance with the custom of the country, he went to a Greek barber to have the wound dressed, and the barber employed at least ten living ants to bite the two sides together. Pressing together the margins of the cut with the fingers of the left hand, he applied the insect by means of a pair of forceps held in the right hand. The mandibles of the ant were widely open for self-defence, and as the insect was brought carefully near to the wound, it seized upon the raised surface, penetrated the skin on both sides, and remained tenaciously fixed while the operator severed the head from the thorax, so leaving the mandibles grasping the wound. The same operation was repeated until about ten ants' heads were fixed on the wound, and left in position for three days or thereabouts, when the cut was healed and the heads removed. The ant employed is described by Mr. Issigonis [the gentleman referred to] as being about three-eighths of an inch long, very dark brown in colour, and of a particularly fierce disposition."

Eugonia fuscantaria and Ennomos quercinaria.—I notice that Mr. Kane, in his list of the Lepidoptera of Ireland (Entom. xxx. 59), mentions that there is a difficulty in distinguishing *E. fuscantaria* from the var. *infuscata* of *E. quercinaria*. I do not know to which particular variety the name *infuscata* refers, but I have never yet seen any specimens of *E. quercinaria* that could be confused with *E. fuscantaria*, and I have bred a considerable number of both species. Apart from the coloration, and the direction of the transverse lines, *E. fuscantaria* may be easily distinguished by the peculiar hooked angle on the hind margin of the primaries.—Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W.

Amphydasys betularia var. doubledayaria.—I was much interested regarding the capture by Mr. Mera of this variety in the London district, as I have this year, for the first time, bred an example (a male). Three larvæ were taken on willow near Mortlake, and one produced the black variety, the others typical specimens. — Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W.

Angerona prunaria: is the Larva a general feeder?—In a well-known habitat of the above species I have frequently searched and beaten for the larvæ, but without obtaining a single example; several of my friends have had a like experience both in Essex and the West of England; and I do not remember any mention of the larvæ having been beaten out in the numerous lists that have appeared in the

'Entomologist.' I had occasion this year to let the young larvæ choose their own pabulum; and very few plants in my greenhouse escaped their attention, and they were particularly partial to mint and *Nicotiana affinis*, also to ash, elder, fig, oleander, honeysuckle, wallflower, &c. Privet is really the best food for them, especially during hybernation, as the larvæ will feed in mild weather, and produce very early imagines. —ALFRED T. MITCHELL; 5, Clayton Terrace, Gunnersbury, W.

CAPTURES AND FIELD REPORTS.

NOTES AND OBSERVATIONS ON LEPIDOPTERA DURING THE PAST YEAR.—The following extracts from my note-book for 1897 may perhaps prove of some interest. When no locality is specially mentioned the district within a radius of ten miles of Birmingham is intended.

Pieris brassicæ has been very scarce during the past four years; this year, however, the species seems to have regained to a small extent its former abundance.

Pararge egeria. A few examples of the second brood were observed in Northamptonshire during September.

Lycæna argiolus. I came across this insect in the lanes, which abound to some extent with holly, around Yardley Wood and Shirley (about seven miles south-west of Birmingham). I fancy this locality is comparatively unknown, even to local collectors. This insect is very restricted in its range in the Midlands, Sutton Park (N. Warwickshire) being its head-quarters, but, curiously enough, only the early brood occurs there; this fact has been noticed by others. It also occurs around Coleshill and Malvern, and doubtlessly in a few other localities further away.

Sphinx ligustri. I found five larvæ of this species at Northampton, on or about Sept. 24th, one of which was full-grown, two were rather more than half so, and the other two were very small, but little more than an inch in length; hence these latter two must have come from a late and separate batch of ova, but surely an unusually late date. The first of the five pupated on Sept. 29th, and the last on Oct. 18th.

Smerinthus ocellatus, S. tiliæ, and *S. populi.* Larvæ of all three were plentiful at the beginning of September at Northampton,

Nemeophila (Chelonia) plantaginis. This insect was much scarcer than it usually is in Sutton Park; some examples show a tendency towards the var. *hospita.* I have never met with specimens showing any development of red from this locality.

Cossus ligniperda. Young larvæ swarmed around Norwich, attacking oak, elm, and ash, besides willow and poplar; but, strange to say, I only found three full-fed ones. I do not think many had spun up then.

Cerura vinula. Larvæ in abundance, and I have come across a great many cocoons lately; none were more than a foot from the ground.

Leucania lithargyria. This and *Phlogophora meticulosa* were the only insects taken at sugar here: though successful in other parts of the country, sugaring proved an absolute failure in this district.

Neuronia popularis. Swarms at gas-lamps; all males with the exception of a single female.

Hydræcia micacea. At a light; September.

Mamestra persicariæ. Larvæ on mint and dock.

Triphæna ianthina. Beaten from hedgerows.

Tæniocampa gothica, T. incerta, T. gracilis, and *T. stabilis.* The commonest pupæ taken by digging, chiefly at roots of oak. They are very easy to find, being enclosed in no cocoon (or a very slight one) and do not penetrate deep into the earth.

Orthosia litura. Great numbers taken at sugar around Norwich and at Northampton, sometimes as many as seventy were met with in a single night; varies from dark brick-red to silvery grey.

Agrotis suffusa. At sugar at Northampton.

Xanthia aurago. At sugar near Norwich; in splendid condition.

Polia chi. On palings; is rather scarce and local in this district.

P. flavocincta. Great numbers, in perfect condition, at Northampton. Came to sugar soon after dusk; about half an hour later they began to draw off with unvarying regularity. I have noticed this elsewhere.

Amphipyra tragopogonis, Came across nearly two dozen, hybernating under a piece of loose bark high up on an oak, while hunting for Coleoptera. Very common at sugar at various places where I collected during September.

Catocala nupta. In very fine condition, at sugar, near Norwich.

Crocallis elinguaria. A solitary larva found feeding on currant (a very unusual food-plant) produced a female which laid about thirty ova, all of which, of course, soon shrivelled up.

Tephrosia crepuscularia. On tree-trunks, Sutton Park; May; all were very pale.

Ematurga atomaria. Common enough on the heaths, Sutton Park, but all males.

Hybernia progemmaria var. *fuscata.* Sutton Park.

Larentia didymata. The commonest Geometer of the year.

Eupithecia lariciata. Especially common about larches in Sutton Park.

Abraxas grossulariata. Larvæ observed feeding on hazel and sallow, nearly a mile from any garden.

Anaitis plagiata. A few specimens of the second brood taken at light near Norwich; ground colour more or less brownish, not grey.—AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire.

COLIAS EDUSA, &c., IN CORNWALL.—On October 18th we were favoured here with a brilliant sunny morning, warm, and with a light wind from the south-west. During a walk of a couple of hours I took, on the wing, *Colias edusa* (two fine males), *Pyrameis cardui, Polyommatus phlæas* (five in good condition), and *Pieris brassicæ* (two males). I also saw on the wing *Pieris rapæ, Pararge egeria, P. megæra,* and *Vanessa atalanta.* All the insects were in remarkably good condition. Is it not unusually late for *P. phlæas, P. egeria,* and *P. megæra?* Our climate is, of course, very mild.—W. A. ROLLASON; 13, Lemon Street, Truro, Cornwall.

LATE DRAGONFLIES.—Walking by the side of the Black Pond at Esher, in the beautifully warm weather that we experienced on Nov. 14th, I was agreeably surprised to find a few specimens of *Sympetrum striolatum,* disporting themselves in the sunshine over one corner of the pond. The deep coloration of their wings, as well as the ease with which they might be approached, testified to their advanced age; but, though veritable centenarians amongst this season's dragonflies, one female at least was busily engaged in oviposition. I had last seen the species at the same place on

Oct. 24th, when a few *Sympetrum scoticum* were also in evidence. On the same day (Oct. 24th) a fine male *Æschna cyanea* was picked up alive in a gutter at Kingston. Its colours faded very little in drying, possibly because it may not have been feeding much just previous to its capture. October 24th I look upon as a late date for dragonflies, and it may be guessed that I little expected to see any three weeks afterwards.—W. J. LUCAS, B.A.; 21, Knight's Park, Kingston-on-Thames, Nov. 15th, 1897.

COLIAS EDUSA, &c., AT FOLKESTONE.—At Folkestone, in the middle of October, while the guest of Dr. Knaggs, I availed myself of frequent opportunities of sugaring for Noctuæ in a part where success is generally to be met with. As the evenings were apparently most favourable, it was remarkable how few moths were attracted. *Phlogophora meticulosa* and *Miselia oxyacantha* together, a few worn *Cerastis vaccinii*, and *Catocala nupta* being almost the only species which presented themselves. Several entomologists of the neighbourhood had sugared during the earlier part of the month with similar results; and the beating of ivy bloom was not more productive. Such being the state of night-work, it was cheering to see a number of diurnal species such as *Vanessa atalanta*, *V. urticæ*, and *Chrysophanus phlæas*, disporting themselves over the rugged ground of the warren; and even more pleasing was it, when descending Baker's Gap, on the 30th of the month, to see a male specimen of *Colias edusa* fluttering by in the mid-day sunshine, It is rather a late date for the latter species to be abroad, and may therefore be worthy of record.—HENRY A. AULD.

ACRONYCTA ACERIS.—On Sept. 2nd last I was spending the day in London, and in the course of my wanderings found myself near West Kensington Station. I had to take shelter for a few moments during a very heavy thunder-shower; and on resuming my walk along a path bordered by a high black paling which divides part of the station from the road, I noticed, to my surprise, a full-fed larva of *A. aceris* attempting to ascend the paling. Out came the every-ready chip-box, into which I speedily transferred the larva, and had the satisfaction of seeing it spin up two days afterwards. Behind the paling was a solitary dismal-looking sycamore tree, from which the larva was doubtless shaken by the shower. Had I had the time and inclination to dirty myself by scrambling up the grimy paling and still grimier tree, I should probably have found more of its brethren. What singular taste could have led any self-respecting moth to lay its eggs in such uncomfortable quarters? Has this species been previously recorded in the metropolis?—H. W. SHEPHEARD-WALWYN; Bidborough, Tunbridge Wells.

[Larvæ of *Acronycta aceris* are not by any means uncommon objects, in their season, about gardens and squares in London. Several were observed this year in Chelsea and Kensington.—ED.]

ACRONYCTA AT LIGHT.—With reference to the Editor's note on *A. alni* at light (*ante*, p. 298), see 'Entomologist,' vol. xxiii. p. 262, and 'Record,' vol. iii. p. 132.—F. WHITTLE; 3, Marine Avenue, Southend, Oct. 10th.

NOTE FROM PORTLAND.—The following captures have been made here by me this season:—*Sphinx convolvuli*, eleven specimens between Aug. 14th and Sept. 16th. *Colias edusa*, five specimens (one var. *helice*) between Aug. 23rd and Sept. 13th. *H. hispidus*, fifty specimens between Sept. 2nd and 16th.—J. T. HYDE; The Grove, Portland.

ACHERONTIA ATROPOS IN LANCASHIRE.—In your excellent magazine, *ante*, p. 298, I saw a request from a Lancashire man for recent records of the occurrence of *A. atropos* in the county. Here are four records that have come under my direct notice:—Sept. 21st, 1895, one imago (captured), F. C. Thompson, Prescot. Sept. 28th, 1895, one imago (captured), R. Freeman, Prescot. Oct. 4th, 1895, one imago (seen), F. C. T. and R. F., Prescot. Sept. 3rd, 1896, one larva, H. B. Jones, Crosby. — (Rev.) R. FREEMAN; Prescot, Lancs., Nov. 10th, 1897.

VANESSA ATALANTA.—On Nov. 10th, while my brother and I were wandering through Mount Edgecumbe Park, Plymouth, we saw four perfect specimens of *V. atalanta* hovering round and settling upon the trunk of a small oak-tree. There was nothing very unusual in this, but one is always glad of a reminder of the summer when the cold of winter is setting in.—(Rev.) B. HARVIE-JELLIE; St. Helens, Lancs.

CHŒROCAMPA PORCELLUS.—As I have not heard of *C. porcellus* having been taken in Suffolk this year, I should like to record the capture of a specimen, after dark, in the neighbourhood of Ipswich.—E. PLATTEN; 2, Prospect Cottage, Bramford Road, Ipswich, Sept. 23rd, 1897.

MICRO-LEPIDOPTERA IN 1897.—Micros have been rather abundant in point of numbers, although not so in quantity of species. The following are the chief insects encountered:—*Halias chlorana*, plentiful, both as larvæ and imagines, but local; *Hypena proboscidalis*, *Botys verticalis*, *urticalis*, and *lutealis*; *Phyctænia* (= *Ebulea*) *sambucalis*, rather scarce; *Tortrix sorbiana*, *T. pyrastrana*, not very common; *T. viridana*, swarms (larvæ exceedingly destructive); *Phibalocera quercella*, *Dasycera sulphurella*, extremely common about currant bushes; *Spilonota roboraria*, a pest; *Incurvaria capitella*, *Alucita polydactyla*, *Pterophorus pentadactylus*.—A. D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, October, 1897.

ODONESTIS POTATORIA: ABERRATION OF THE FEMALE.—My friend Mr. Dolman has again bred a very remarkable series of *O. potatoria*, only two females being typical. The larvæ were collected in West Sussex.—ALFRED T. MITCHELL; 5, Clapton Terrace, Gunnersbury, N.

NOTES ON THE SEASON OF 1897.—The season for Lepidoptera, now fast drawing to a close, has, in the localities I have visited, been somewhat variable and contradictory as regards the numbers of individuals, some common species having been exceptionally abundant, whilst others only turned up sparingly. On March 13th I noticed a male *Gonopteryx rhamni* on the Cotswolds. I only tried the sallows on two or three occasions in the Clevedon district of Somerset, when certain species of *Tæniocampa* were fairly abundant. *Tephrosia crepuscularia* was seen on March 20th, and *Lycæna argiolus* on the 25th. On travelling down into South Wales the last week in April, *Pieris rapæ* appeared commonly in several places by the side of the railway. In Carmarthenshire, where I remained until early in July, this butterfly and *P. napi* were quite scarce. Some days in May being as cold as February may have affected them; on one occasion I noticed a specimen of *P. rapæ* quite benumbed. *Lycæna argiolus*, *Argynnis euphrosyne*, *Euchloë cardamines*, and *Pararge egeria* were, however, comparatively abundant. *L. icarus* emerged later than usual, doubtless affected by the cold temperature, but was not at any time so common as in some previous seasons. In June *Agrotis exclamationis*

and *Xylophasia polyodon* swarmed at sugar, but other common Noctuæ were only in moderate numbers. On no occasion did I observe many of the Geometræ abundant. Larvæ of many species of Lepidoptera also appeared very scarce, quite different to the season of 1896, when some turned up continually. *Bombyx neustria* was this season, however, a notable exception. The greater part of July was spent in Breconshire, in the valley of the Wye. On the 12th I noticed a male *Euchloë cardamines*, *Argynnis aglaia* in some spots might be commonly seen, but *Argynnis selene* was then declining. During August and September I visited that delightful and wild part of Devon, the Dartmoor district, staying near the source and valley of the Teign at and near Chagford. The Diurni then out were in moderate numbers, *Pararge egeria* and *Epinephele tithonus* being the most abundant. *Vanessa io*, *V atalanta*, and *V. urticæ* might not unfrequently be seen at the heath and heather bloom, and I also saw an occasional *V. cardui*. Here, also, *Plusia gamma* frequently came for the sweets. Sugaring I only tried on two occasions, when absolutely nothing appeared. In September a female *Trichiura cratægi* was taken one evening flying, and about to deposit ova on the blackthorn. *Eugonia angularia* occasionally turned up, and the last brood of *Rumex cratægata*. *Macroglossa stellatarum* I watched one evening hovering over the blossom of a *Phlox* in a garden. During the past month of October, I have on many occasions tried the ivy-bloom with a friend, in the Cleveland district of Somerst; but, with the exception of *Anchocelis pistacina* and *Phlogophora meticulosa*, all the autumn moths have occurred sparingly. I have not heard of either *Sphinx convolvuli* or *Acherontia atropos* during the season. On one occasion only I noticed *Colias edusa*, a female specimen, at Tenby, on June 23rd.

On May 26th, in Wales, I observed *Argynnis euphrosyne* deposit ova on a species of *Veronica;* and on another plant, a *Hieracium* (?). These ova I forwarded to a friend who is making drawings of the ova of Lepidoptera. Are not the above-named plants uncommon as food for the larvæ? Our books usually give species of *Viola*, I believe.

Of other insects during the season, different species of dragonflies might frequently be seen, and several kinds of wild bees, commonly, but of wasps scarcely a dozen throughout the summer or autumn.—T. B. Jefferys; Bath, Nov. 2nd, 1897.

SOCIETIES.

Entomological Society of London.—*November 3rd*, 1897.—Mr. R. Trimen, F.R.S., President, in the chair. The President announced with regret the death of Mr. J. W. Dunning, formerly Secretary and President of the Society, and referred to his constant interest in it and zeal for its welfare. The Treasurer also spoke warmly of his great liberality towards the Society in times of financial straits, and of his successful efforts in procuring the Royal Charter, the cost of which he defrayed. Mr. Selwyn Image, of 6, Southampton Street, W.C., was elected a Fellow of the Society. Mr. J. J. Walker exhibited specimens of *Anisolabis annulipes*, Luc., an introduced species of earwig taken among bones at the chemical works at Queenborough, and of *Brachysomus hirtus*, Boh., a rare weevil, taken among dead leaves at Chatham. Mr. Janson exhibited a variety of *Melanargia galatea* of a clear yellowish cream-colour, without trace of the usual black markings. It was

captured between Dover and Walmer in 1843, and was still in perfect condition. Lord Dormer showed a remarkable openwork cocoon of an unknown Japanese moth, constructed from the larval hairs. Mr. Jacoby exhibited fine examples of both sexes of the Australian Hepialids, *Charagria ramsayi*, *C. splendens*, and *Hepialus daphnandri*. Mrs. Nicholl exhibited a selection from the butterflies collected by her this year, in June and July, in the Albarracin Mountains in Aragon, containing several additions to the list of the district published in Madrid by Canon Zapater and Herr Max Korb. The species of greatest interest were *Erebia zapateri*, Oberth.; *Cœnonympha iphioides*, Staud.; *Satyrus prieuri*, Pier., and its fulvous female var. *uhagonis*, which was observed to be much more attractive to the males than the normal form was; *Argynnis hecate*, Esp.; and *Parnassius apollo*, L., of which a female variety occurred, with red-centred ocelli on the upper side of the fore wing. The Rev. H. S. Gorham showed examples of the following rare beetles from the New Forest:—*Notiophilus rufipes*; *Velleius dilatatus*, four specimens, of which two were found in copula; *Trichonyx sulcicollis*; and a single example of *Lytta vesicatoria* from Shirley Warren. Mr. Tutt showed a series of Noctuæ, taken at Romford by the Rev. W. Claxton, all of aberrant form; and for Mr. J. Merrin, a specimen of *Vanessa urticæ* with a silvery costal spot on the under side of the fore wings, a series of *Melitæa aurinia*, and an example of *Syrichthus malvæ* ab. *taras*, taken near Gloucester. Mr. Kirkaldy exhibited a complete series of species of the genus *Notonecta*, L.; specimens of the larva and imago of the very rare *Deinostoma dilatatum* (Say), from Arizona; and specimens of *Antipalocoris marshalli*, Scott, from Ceylon, which was previously recorded from Corsica alone. Papers were communicated by the President on "New or little-known Species of African Butterflies," and by Mr. E. Meyrick on "New Lepidoptera from Australia and New Zealand."

Nov. 17th.—Mr. R. McLachlan, F.R.S., Vice-President and Treasurer, in the chair. The chairman referred with regret to the death, while serving on the Indian Frontier Expedition, of Capt. E. Y. Watson, Fellow of the Society, and well known for his writings on Oriental Rhopalocera. Miss E. F. Chawner, of Forest Bank, Lyndhurst; Mr. F. N. Brown, M.R.C.S., of the Elms, Chobham, and Natal; Mr. Albert Harrison, F.C.S., of 72, Windsor Road, Forest Gate; Mr. Albert Norris, of Church Lane, Napier, New Zealand; Mr. Stephen Pegler, of Retford, Notts: Mr. Edward G. J. Sparke, B.A., of 1, Christchurch Villas, Tooting Bec Road, S.W.; and Mr. Wilmot Tunstall, of Brook House, Meltham, near Huddersfield, were elected Fellows of the Society. Mr. Selwyn Image exhibited male examples of *Pieris brassicæ*, with a black spot on the disc of the fore wings. They were bred from larvæ found feeding on *Tropæolum* at Lee, N. Devon, in the autumn of 1896, and six out of ten males showed this variation. He also showed a dark aberration of *Vanessa urticæ*, taken at Copthorne in Sussex; and exhibited two fine specimens of *Plusia moneta* taken at valerian, near Balcombe, Sussex, on June 30th, 1897. Mr. M. Burr exhibited three new species of Rumanian Orthoptera in illustration of a later communication. On behalf of Mr. T. D. A. Cockerell, of Mesilla, New Mexico, two specimens of *Synchloë lacinia* from that locality were exhibited, to show the remarkable forms of variation found in indi-

viduals occurring at the same time and place and on the same flowers. Mrs. Nicholl communicated a paper "On the Butterflies of Aragon," and Mr. Burr a "List of Rumanian Orthoptera." Mr. Tutt read a paper entitled "Some Results of Recent Experiments in hybridizing *Tephrosia bistortata* and *T. crepuscularia*." — W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*September* 23*rd*, 1897.—Mr. R. Adkin, F.E.S. President, in the chair. Dr. Chapman, F.E.S., Elmscroft, Red Hill, was elected a member. Mr. Malcolm Burr presented to the Society's museum an almost complete collection of British Orthoptera. Mr. Auld exhibited, series of *Tapinostola bondii*, from Folkestone; of *Caradrina ambigua*, from Devon, where it has been somewhat common this year; of *Dianthœcia nana*, from Shetland; and of *Tæniocampa gothica*, also from Shetland. Mr. Adkin, bred series of *D. nana* from Shetland larvæ, showing much variation. On behalf of Mr. de V. Kane, a specimen of *Larentia flavicinctata* taken in Antrim. Mr. Tutt, on behalf of Mr. Dutton, a very fine and variable series of *Abraxas sylvata* (*ulmata*). A good proportion of the specimens were smoky or partially smoky, and these seemed somewhat thinly scaled; and as they were slightly crumpled and difficult to set, Mr. Dutton had suggested that the aberrations were due to malnutrition. Mr. Tutt also showed three species of *Ascalaphus* which he had captured in the Southern Alps, together with two species of ant-lion. Mr. Burr, a specimen of *Phyllocrania illudens*, a mantis from Madagascar, with the leaves with which it is found. It is an extraordinary example of adaptation to surroundings, being very difficult to find even when attention is called to it in a small box. Mr. Turner, specimens of the hawk-fly, *Asilus crabroniformis*, from Seaton, Devon, and a series of the hemipteron, *Enoplops scapha*, taken over a very restricted area in the same locality on the leaves of coltsfoot. A paper was read entitled, "The British Day Butterflies, and the Changes in the Wings of Butterflies," communicated by Prof. A. Radcliffe Grote, A.M., in which he at some length explained his views as to the evolution of the venation, illustrated his remarks by, and applied his theory to, the British butterflies, criticised the work of Mr. Meyrick, and more fully explained himself to his own critics.

October 14*th*. — The President in the chair. Mr. Mansbridge exhibited varieties of *Abraxas grossulariata*, bred this season from Horsforth larvæ. The aberrant forms were not so numerous this year, but the line of variation was similar to that observed in former years, *viz*. a gradual suffusion of the fore wings with the black colour. Mr. South, two specimens of *Pieris rapæ* taken at Folkestone in September, by Mr. Sabine, each having a spot on the hind wings between veins 3 and 4; he noticed the same peculiarity in some specimens of *P. napi*, and said that the same variation occurred in some allied Chinese Pierids. Two specimens of *Callimorpha dominula* var. *rossica*, obtained from Dover by Mr. Sabine, and a bred series of *Acidalia inornata*, were also exhibited by Mr. South. Mr. H. Montgomery, on behalf of Mr. E. Montgomery, a series of bred *P. napi*, including specimens with traces of an additional spot, and read notes on the variation shown in the series. He also exhibited an aberrant speci-

men of *Epinephele tithonus* in which the ground colour was pale brownish buff, and the usual fulvous marking paler than in normal examples, and a specimen of *Abraxas grossulariata* having an additional complete band on the hind wings. Mr. McArthur, a specimen of *Arctia caia* with perforated wings, which had been caused by the larva changing to pupa on the sandy bottom of the cage, a piece of grit piercing the wing-case. There was also an indentation in the hind margin, perfectly ciliated, which had no doubt been caused by a similar obstruction. Mr. Cockerel communicated a note upon a peculiar case of protective coloration observed by him in Mexico. In a clump of orange composite flowers he saw a Vanessid pupa and a larva of a Sphinx about to change its skin. Mr. Ficklin, a series of *Polia flavicincta* from Cornwall, small, but brightly marked. Mr. Lucas, an immature form of a locust sent him from Kew Gardens. Mr. West, of Greenwich, series of the Hemiptera *Acanthosoma tristriatum*, from juniper bushes at Box Hill, and *Pantilius tunicatus*, beaten from hazel. Mr. R. Adkin, specimens of *Nonagria arundinis* (*typhæ*), bred, from Shoreham pupæ; one was of a reddish black, and another mahogany on the fore wings. He made some remarks upon the cleansing of the bodies of these and similar insects. A considerable discussion ensued on this subject.

October 28*th*.—The President in the chair. Mr. H. B. Brown, B.A., Hammersmith, was elected a member, Mr. Montgomery exhibited a long bred series of *Cidaria truncata* (*russata*). The parent was var. *centum-notata*, but none of those bred were of that form. Also a bred series of *Acidalia dimidiata* from July ova, and stated that some half a dozen larvæ were not feeding up, and apparently intended to hybernate; specimens of *Apamea ophiogramma*, bred from ova; and a *Cidaria corylata* which emerged the end of September. Mr. Newman, large first and second broods of *Arctia caia*, the former from larvæ taken around Darn, the latter from ova, and reared in a greenhouse. Considerable variation was shown, but only one of the more extreme dark forms and one of the yellow hind wing forms occurred. A small, very pale specimen was the most unusual form. Also bred examples of *Odonestis potatoria*, of various forms, from Darn; *Dryas paphia*, with white patches; *Argynnis adippe*, increase of dark markings, both from Goodwood; *Epinephele ianira*, two specimens with the usual fulvous colour quite white, from Singleton; and a bred *Smerinthus populi* of a very pink tinge. Mr. Tutt, on behalf of Dr. Riding and Mr. Bacot, a long series of the much debated Tephrosias, together with crosses, hybrids, mongrels, &c., and made remarks upon the results of their experiments; on behalf of Mr. Merrin, a long series of vars. of *Melitæa aurinia*, and a specimen of *Vanessa urticæ*, having an incipient silvery mark on the under sides of the fore wings; on behalf of Mr. Horne, an almost completely black var. of *Nemeophila plantaginis;* and on behalf of Mr. Griffith, a series of Tephrosias taken in the Bristol woods. Mr. Moore, a specimen of *Enodia portlandica*, from North America, and said that it did not seem right to place this species and *E. hyperanthus* in the same genus; also a specimen of *Locusta viridissima*, with its eggs, from Chambery. Mr. Adkin, vars. of *Argynnis selene* from Sutherlandshire; these were much duller than usual, and had large pale marginal spots. Mr. Merrifield, a very large

number of specimens bred under extremes of temperature, to illustrate his *résumé* entitled, "Recent Examples of the Effect on Lepidoptera of Extreme Temperatures applied in the Pupal Stage."

November 11*th*.—The President in the chair. Mr. Tutt exhibited a number of *Psyche* cases, taken by Messrs. Edwards, Tunaley, and himself, in the Forest of Fontainebleau, including *Psyche unicolor* (*graminella*), *P. opacella*, *Epichnopteryx bombycella*, and *Fumea nitidella* (*intermediella*). Mr. Filer, a long series of mottled forms of *Nonagria arundinis* (*typhæ*) bred by Mr. Dennis and himself, from Surrey. Mr. Bishop, specimens of *Vanessa urticæ*, one having very large spots, and the other approaching var. *ichnusa*, both from Epping; *Agrotis exclamationis* with scarcely perceptible markings; *Melanippe fluctuata* having a broad marginal band dark, the inner area light, with the exception of a black costal blotch on the fore wings; and various varieties of *Fidonia atomaria*. Mr. Moore, the following Orthoptera from La Grande Chartreuse:—*Stetheophyma variegata*, *Decticus verrucivorus*, *Psophus stridulus*, *Stenobothrus geniculatus*, *S. declivus*, *Œdipoda fasciatum*, and others; and contributed interesting notes and observations. Mr. Adkin, bred specimens of a black variety of *Odontopera bidentata* from Westmoreland. Mr. Bishop reported that on Nov. 7th he found a female sallow bush on the North Downs in flower. Mr. Tutt read a paper entitled, "The Drinking Habits of Butterflies and Moths," and a long discussion ensued.—Hy. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*September* 20*th*, 1897. Mr. R. C. Bradley in the chair. Mr. G. W. Wynn exhibited a nice series of *Tæniocampa opima*, bred from larvæ from the Cheshire coast; also the following insects, all bred, from Wyre Forest:—*Orgyia gonostigma*, *Notodonta trepida*, *Asphalia ridens*, *Geometra papilionaria*, *Amphidasys prodromaria*, and a nice little series of *Endromis versicolor*, raised from a colony of thirteen larvæ found; also *Leucoma salicis* bred from larvæ found near Coventry, a nice series of *Melanthia albicillata* from Sutton larvæ; and *Hecatera serena* found near Kidderminster. Mr. J. T. Fountain, a series of *Dianthœcia capsincola*, bred from larvæ found locally at Small Heath, &c.; also a specimen of *Lycæna argiolus*, small, and with the right wing bleached, the outer half being whitish and the basal half blue as usual; also a male specimen of *Lycæna corydon*, from Swanage, with the white of the hind marginal spots so much extended that on the fore wings the black was only left on the nervures, and on the hind wings the white appeared as large submarginal spots with small dark centres. Mr. R. C. Bradley, *Cynomyia mortuorum*, which he had taken the day before at Droitwich; he had not known of this species formerly in the Midlands. Mr. P. W. Abbott, a specimen of *Aporia cratægi*, taken by Mr. H. Douglas Stockwell near Dover, on June 22nd last; also, in conjunction with Mr. Albert J. Hodges, short series each of *Leucania albipuncta*, *Heliothis peltigera*, *Caradrina ambigua*, and *Laphygma exigua*, all taken in South Devon during August last. Mr. and Mrs. Abbott, and Mr. Hodges, between them secured twenty-four specimens of *L. exigua*, and three other entomologists working near them obtained the same number.

October 18*th*.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. R. C. Bradley showed the following Diptera from Sutton:—

Machimus atricapillus, the first true Asilid he had seen there; *Helophilus trivittatus*; and *Cynomyia alpina*, a species which is marked doubtfully British in Mr. Verrall's list, but was confirmed by Mr. Grimshaw in the Annals of Scot. Nat. Hist. 1897, who took it in South Ayrshire. Mr. Bradley had taken twenty in his garden, all males; he said that it was so much like *Musca vomitoria* that it was probably overlooked on that account. Mr. A. H. Martineau, *Asilus crabroniformis* from Nevin, North Wales; also a smaller species of *Asilus*, with a *Lycæna alexis* in its grasp. Mr. Bethune-Baker, two drawers from his collection, containing a portion of the genus *Pieris*. Mr. P. W. Abbott, *Deilephila galii*, from Wallasey, where the larva was found this year by Mr. Victor Wilson; and a short series of *Lithosia caniola*, from South Devon, August, 1897. Mr. G. H. Kenrick read a paper upon "Mimicry," in which he pointed out all the difficulties of the present theories, and came to the conclusion that it was impossible for us to arrive at any positive conclusions until we had more evidence. He exhibited a large number of examples of Batesian and Müllerian mimicry, exhibiting both phenomena in a particularly perfect state.—Colbran J. Wainwright, *Hon. Sec.*

Cambridge Entomological and Natural History Society.—A meeting of the Society was held on Oct. 15th. Mr. Rickard exhibited a specimen of *Chærocampa celerio*, taken recently in Cambridgeshire, and an imago of *Carpocapsa saltitans*, reared from the so-called "jumping bean." He also exhibited some small ichneumons, bred from a probably deltoid larva; he said that they are peculiar in that they do not kill their host, and he believes that they inhabit the alimentary canal of the caterpillar, and escape by the anus. He has seen the caterpillar carrying the cocoon made by one of these larvæ, holding it with the anal claspers for some days, as if to incubate it. Mr. Farren exhibited a var. of *Dianthœcia conspersa* from Shetland, *Cidaria corylata* var. *albo-crenata* from Rannoch, and *Tæniocampa gothica* var. *gothacina* from Loch Laggan. Dr. Sharp exhibited several South American cocoons of two species, one bombycoid, the other psychid. One of the former contained a large ichneumon cocoon, in which again were smaller ones of another species, while two others had been used by a mason wasp and a leaf-cutting bee respectively to make their nests in. The psychid cocoons were tubular, about four inches long and half an inch thick, the females being largest, and it appeared that the female moths never leave the cocoon, for one of them was found hardly free from the large chrysalis, embedded in soft scales, and almost maggot-like in appearance. Although the larvæ spend a large part of their life in these cocoons, yet a large proportion were found to have been killed by parasites. Mr. Bedford exhibited three varieties of *Epinephele hyperanthus*, taken near Brockenhurst at the end of June; in the first, a female belonging to the "lanceolate" type, all the parts of each ocellus were correspondingly enlarged, the central pupil in some being considerably elongated; in the second, a male, the aberration affected the fore wings only, and consisted in a tendency for the yellow band of each ocellus to spread over the surface of the wing, forming irregular and asymmetrical blotches, the rest of the ocellus being quite normal; the third case was that of a male in which the right hind wing only was

abnormal, both the black and yellow bands of all the ocelli, except that nearest to the anal angle, being so much enlarged as to run into one another, forming a black streak surrounded by yellow, covering the greater part of the wing and traversed by the wing rays, which were dusted over with yellow scales; the pupils of three of the ocelli were quite normal, that of the fourth (next to the costal margin) was barely visible.

A meeting of the Society was held on Oct. 29th. Mr. Fanen exhibited *Hesperia lineola*, from Burwell Fen; *Polia xanthomista*, from the Isle of Man; *Dasycampa rubiginea* (reared), from Reading, and *Aplecta occulta*, from Rannoch. Mr. Lefroy exhibited specimens of some salt-water insects from South Wales; a beetle (*Oxylebius legolesius*) and its larva; a rat-tailed maggot resembling *Eristalis;* and two Chironomid larvæ, with the pupa and fly of one of them. They live in small salt pools on the face of a cliff, about ten feet above high tide, the saltness of the water varying greatly from time to time. Dr. Sharp exhibited a small portion of the collection of Carabidæ made by Mr. Perkins in the Hawaiian Islands for a committee of the Royal Society and British Association. Seven or eight hundred specimens, representing five or six very closely allied forms, were shown. He stated that these forms were so extremely closely allied that it was reasonable to consider them as modifications of one species that had undergone change in connection with difference of locality. Some of the forms, however, were from the same island, so that it was not possible to consider the geographical isolation as the immediate or sole cause of the distinctions.

Nonpareil Entomological and Natural History Society.—*Annual General Meeting, October 7th*, 1897.—Officials elected for Session 1897–8:—President, Mr. Thomas Jackson; Vice-President, Mr. W. Stevens; Curator, Mr. W. Harbur; Secretary, Mr. F. West; Treasurer, Mr. H. Blake; Reporting Secretary, Mr. F. A. Newbery; Librarian, Mr. F. Craft; Trustees, Messrs. Huckett and Gurney; Committee, Messrs. Huckett, Gurney, Norman, Cooper, Moore, W. Harpur, Butt, Lusby, Samson, and Pickett. Mr. J. A. Clarke exhibited a choice and variable series of *Argynnis aglaia* taken at Bevendene, near Brighton. Among them were some fine forms, many being greatly suffused. Mr. Clarke contributed a nice box of insects to the Society's cabinet. Mr. Pickett exhibited three curious cocoons from Guildford; one taken last year had no opening; and of the other two (both taken this year), one had two openings—one at each end—and the remaining one contained three pupæ; also remarkable vars. of *Lycæna corydon*, taken at Dover on August Bank Holiday last. Two female specimens varied on the under side, one being larger than usual and had the black spots large in prpoortion. One under side was minus the black spots. Of the females there was a splashed var., one dwarf, another very dark under side, and a specimen in which the three spots on the under side were confluent, and formed a short black streak. Two examples of *Nemeophila plantaginis* taken at Folkestone, one being of the normal type, and the other a specimen in which the yellow on the under wings was replaced by bright red. Mr. Sampson exhibited a series of specimens, varying from light to dark, of *Eugonia angularia*, all bred from a female taken in Monk Wood.—F. A. Newbery, *Rep. Secretary.*

RECENT LITERATURE.

Life-Histories of American Insects. By CLARENCE MOORES WEED, D.Sc. With 21 plates and many figures in the text. Pp. 278, sm. 8vo. New York and London: The Macmillan Company. 1897.

COMPRISES twenty-six non-technical essays on certain species or groups of species occurring in America. These appear to have been prepared with great care, and although written in simple language they are nevertheless generally scientifically accurate. The plates and figures in the text are admirable. Altogether the book is one that should prove both interesting and instructive, not only to American but also to British readers.

Report of the State Board of Agriculture on the Work of Extermination of the Gypsy Moth. Plates 6, pp. 85, 8vo. Boston: Wright & Porter. 1897.

SINCE 1893 something like 100,000 dollars have been received by the Committee each year from the State for carrying on the war against the moth, but this sum is not considered sufficient; and it is suggested that if the enemy is to be completely overcome an appropriation of not less than 1,575,000 dollars spread over a period of fifteen years, an average of 105,000 dollars per annum, will be required.

It certainly seems remarkable that while unsuccessful attempts have been made to turn down *Porthetria* (*Ocneria*) *dispar* in Britain, the most elaborate measures taken by Extermination Committees have failed to destroy this species in certain States of America where it has become established and is recognised as a pest. It is estimated that if the insect were allowed to spread it would do damage to the extent of one million dollars in the State of Massachusetts alone.

Proceedings of the Davenport Academy of Natural Science. Vol. vi. 1889–1897. Davenport, Iowa. 1897.

THE Entomological papers comprised in this volume are: "A List of Coleoptera from the Southern Shore of Lake Superior, with Remarks on Geographical Distribution," by H. F. Wickham, M.S., and "Revision of the Truxalinæ of North America," by Jerome McNeill, with six finely executed plates, on which thirty-nine species and structural details are figured.

The following have also been received:—

Biological Effects of Civilization on the Insect Fauna of Ohio. By F. M. WEBSTER. Reprint from the Fifth Annual Report of the Ohio State Academy of Science. Pp. 15.

The Protective Value of Action, Volitional or otherwise, in Protective Mimicry. By F. M. WEBSTER. Pp. 67–77. Journal New York Entomological Society, June, 1897.

The Food Plants of Scale Insects (*Coccidæ*). By T. D. A. COCKERELL. Pp. 725–785. Proc. U. S. Nat. Mus. vol. xix. Washington, 1897.

Further Coccid Notes; with descriptions of new species and discussion of points of interest. By W. M. MASKELL. Pp. 293–331; plates xviii–xxii. *Trans. N. Zeal.* Inst. 1897.

Investigations on the San Jose Scale. Report to the New Jersey State Board of Agriculture, Jan. 13th, 1897. By Prof. JOHN B. SMITH. Pp. 24, illustrated. Trenton, N. J.: The John L. Murphy Publishing Co. 1897.

Directions for Collecting and Preserving Scale Insects (Coccidæ). By T. D. A. COCKERELL. Pp. 10. Washington: Government Printing Office, 1897.

OBITUARY.

JOSEPH WILLIAM DUNNING, M.A., F.L.S., &c.—Mr. J. W. Dunning died suddenly on Friday, the 15th of October last, at his residence, 4, Talbot Square, Hyde Park, W. He was born at Leeds in the year 1833, and was educated privately under tutors until 1851, when he entered Trinity College, Cambridge, as an undergraduate. Having taking the degree of M.A., he was shortly afterwards (in 1858) elected a Fellow of his College. In January, 1855, he was admitted a Law Student, and on the 26th January, 1861, he was called to the Bar by the Honourable Society of Lincoln's Inn. From that time until about five years ago he enjoyed a considerable practice as an equity draftsman and conveyancer, at No. 12, Old Square.

A few years ago he had a paralytic stroke, which partially deprived him of speech and obliged him to retire from the practice of his profession, and a second stroke which he had on October 15th last was the cause of his death.

In his early boyhood Mr. Dunning was a collector of Lepidoptera, and his name is familiar to most of us as being one of the first to capture in this country *Agrophila sulphuralis* (now known as *Emmelia trabealis*). Speaking of this species Mr. Stainton, in his 'Manual,' says, it "used to be a great rarity, but a schoolboy spending his summer holidays at Brandon having taken it, this insect found its way into all our collections, and Mr. Dunning 'awoke and found himself famous.'"

Mr. Dunning joined the Entomological Society in 1849, when a lad of sixteen years of age, the Linnean Society in 1860, and the Zoological Society in 1864. He was Secretary to the Entomological Society from January, 1862, to January, 1871, and was Vice-President several times—namely, in 1875, under the Presidency of Sir Sidney Smith Saunders; in 1877, under Professor Westwood; in 1879, under Sir John Lubbock; and again in 1890, under Lord Walsingham. In 1883 and 1884 he was President of the Society.

It is believed that Mr. Dunning had not many opportunities of giving attention to field natural history after his early boyhood; and his contributions to the Transactions and Proceedings of the Entomological Society are not numerous, but his Presidential Addresses were admirable in point of style. He was the compiler and editor, or at least one of the most active compilers

[illegible]

and editors, of the 'Accentuated List of the British Lepidoptera,' published by the Entomological Societies of Oxford and Cambridge in 1858, and it is believed that he bore, if not the entire, at least the greater part of the cost of the publicationof this List.

His claim to the respect and esteem of all Fellows of the Entomological Society of London is mainly due to the warm interest which he always took in the affairs of the Entomological Society, and to the munificent donations which he constantly contributed to its funds. Over and over again, when the Society was in financial difficulties and the Treasurer's balance-sheet showed a deficit, Mr. Dunning came forward and paid the amount requisite to again place the Society on a proper financial basis. The writer of the present notice remembers that when he was first nominated Secretary, in January, 1886, the then Treasurer informed him that there was a serious deficit. Hearing this, he called on Mr. Dunning at his chambers, and told him the state of the Society's finances. On being furnished with the exact figures, Mr. Dunning at once drew a cheque for the required amount, nearly £40. Quite recently he sent, unsolicited, a donation to the Society of £45.

In addition to constant donations of money and books, Mr. Dunning, by his influence and energy, obtained for the Society its incorporation by Royal Charter in the year 1885. Knowing how many Societies in London, of at least equal importance to the Entomological Society, have failed to obtain a Charter, the Fellows of the Society cannot but feel deeply grateful to the deceased for having procured the Charter, and also for having paid all the fees and other expenses in connection with the grant of the same.

In private and professional life Mr. Dunning was a pleasant and genial companion. His generosity to his friends and associates was equal to that shown to the Entomological Society, with which he had been so long connected. He was a member of the Oxford and Cambridge, the Garrick, and other Clubs, and his *bonhomie* and high spirits made him popular with all sorts and conditions of men.—H. G.

We regret to announce the death of Mr. Neil McArthur, of Brighton, who died on Nov. 18th last, aged seventy-nine. For over forty years he had been interested in British Lepidoptera, and he was especially well acquainted with the species found in the neighbourhood of Brighton and the country for miles around. In 1859 he captured two of the three earliest known British specimens of *Lycæna bætica*; these he took on the downs facing the sea on Aug. 4th and 5th. The other specimen, it may be mentioned, was taken by Mr. Latour on Aug. 4th of the same year near Christchurch. Although Mr. McArthur refrained from communicating his knowledge of insect-life to the public through the medium of the magazines, &c., he was always ready to *give* information to those who sought it.

For
USE IN LIBRARY
ONLY
DO NOT REMOVE
FROM LIBRARY

595.705
E6147
V.30
1897

use a temporary back cover.

DO NOT REMOVE
FROM THE LIBRARY